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ABSTRACT

This manual has been designed to help teachers use microcomputers in the education of handicapped and disadvantaged students. Microcomputer programs listed in section 1 of the manual have been used successfully by practitioners in the instruction of special needs students. Some of the programs were developed by commercial publishers and others are the results of the efforts of individual teachers seeking to improve instruction with the assistance of microcomputers. For each program listed, the following information is provided: the make and model of computer on which it is used, the price, the developer of the program, the contact person, the vocational areas of instruction for which the program was developed, the particular disability for which the program was designed, the instructional format of the program, a description of the program, and information on adapting the program to special populations. A cross-reference section lists microcomputer programs by the computer for which they are designed, and an index lists the programs in alphabetical order. Articles in section 2 of the manual provide ideas on the educational uses of microcomputers. Authors discuss how they use microcomputers in resource rooms and centers, occupational information centers, linkage projects, education exchanges, and computer-related vocational education for disadvantaged students. A software evaluation process using students to try out a given program is described, and a vocational-technical school software-evaluation form is provided. (KC)

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Project CAUSE: Pima Community College Center for the Instructional Use of Microcomputers 315

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Introduction

This manual on Effective Microcomputer Assisted Instruction for the Vocational Education of Special Needs Students has been designed to help teachers utilize the microcomputer in the education of handicapped and disadvantaged students. Microcomputer programs listed in Part I of this manual have been successfully utilized by practitioners in the instruction of special needs students. Some of the programs were developed by commercial publishers and others are the results of the efforts of individual teachers seeking to improve instruction with the assistance of the microcomputer.

A number of microcomputer assisted programs used in the instruction of "regular students" are included with the idea that such programs may also be relevant for use with special needs students. The microcomputer programs have been obtained through the cooperation of many persons from around the nation. We feel that the listed microcomputer assisted programs provide an overview of the kinds of materials which are available and are in use by educators from many geographic and vocational areas.

Articles found in Part II of this manual provide ideas on the educational uses of the microcomputer. Authors discuss how they use microcomputers in resource rooms and centers; occupational information centers; linkage projects; education exchanges, and computer-related vocational education for disadvantaged students. A software evaluation process using students to try out a given program is described and a vocational technical school provided its software evaluation form.

We hope that this manual will help you in selecting and using microcomputer assisted instruction for special needs students.

Acknowlegments

Many individuals willingly shared information on microcomputer programs which were effectively used in instructing special needs students. Each of these inputs is sincerely appreciated. A special note of appreciation is extended to those persons contributing articles to the manual. We especially want to thank Denise Wagner for typing the manuscript and for her careful attention to the details of the manual.

We wish to express our appreciation to the Director of the Vocational Studies Center, Dr. Merle Strong and Dr. Roger Lambert, Associate Director, for providing the fiscal and logistical resources which made this publication possible.

Disclaimers

Endorsement

Microcomputer programs listed in this manual have not been evaluated or tested by our staff members. Each program included was thought by the provider to have merit in the education of special needs students and is provided here for the readers' information.

Prices

The prices listed were those prices in effect at the time the information was collected. It is likely that the prices will be undergoing changes and that programs will be revised or updated by the time you read this manual.

Organization of the Manual

The manual is designed to provide essential information about some microcomputer programs which are currently being used by practitioners. The name of the program is at the top of the page.

The Make and Model of Computer on Which it is Used provides the Brand Name and Model of the computer which can run the program.

The For Sale section gives the price of the program whenever possible. The amount shown is only a guide as prices may have changed since the printing of this manual. Please contact the distributor before sending a prepaid order.

The Developer is the person or agency which developed the program.

The Contact Person is the person who can most easily give information about the program. Often this person is the same as the developer.

The Vocational Areas section lists the areas of instruction for which the program was developed or for which microcomputer programs are available.

The For Which Student section describes which particular disability the program was designed to overcome or for which to compensate for.

The Program Format section describes the instructional format or formats which is incorporated into the program.

The Program Description tells how the program is introduced, how it is used and what followup activities are suggested.

The Describe Any Modifications for Special Populations section includes any additional information which the provider may have made to adapt the program to special populations or to a specific individual's needs.

For the users' convenience, there is a Cross Reference section located at the front of the manual that will make it possible to look up microcomputer programs by computer for which they are designed.

An Index can be found at the back of the manual which lists the microcomputer programs in alphabetical order.

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Cross Reference by Brand of Computer

Apple Computer, Inc.

Administrative Planning System^{tm} (APS) 129
Admiral King Vocational Reading 157
Arc Welding and Related Review 169
Automotive Technician Mathematics, Volume 1 - Arithmetic 170
Career Program 54
Change Maker 34
Comprehensive Power Levels D-E-F and G-H-I 150
Compu-Math Arithmetic Skills 115
Compu-Read 3.0 159
Compu-Spell 160
Computer Literacy 73
Computing Cash Discounts 36
Copyfitting 37
Counting Bee 116
Course Master 76
Critical Reading 161
Curriculum Management System 55
Dairy Farm Management 6
Developmental Stages 87
Discover Basic: Problem Solving with the Apple Computer 41
Eating Smart 98
Edu-Ware Decimals 117
Edu-Ware Fractions 118
Electronics I Final Exam Review 174

Apple Computer, Inc. (contd.)

F.A.R.M. (Farm Accounting and Records Management) 7

FFA Computer Game 8

Factoring Whole Numbers (3 diskettes), Fractions (6) Decimals (4) 120

Getting to Know the Apple 79

How Big? How Heavy? How Long? Converting English Weights and Measures 99

How to Program in the Basic Language 80

Individualized Planning System^{tm} (IPS) 137

Industrial Arts Program 109

Intake: A New Approach 138

Introduction to Basic 82

Job Hunter's Survival Kit 56

Job Hunter's Survival Kit/a work values program is under development 57

Kitchen Measurement Game 100

LAPS for Vocational Agriculture 11

"MAT" Make Me a Test 21

MECC - Elementary Vol. 13 - Nutrition 101

MESA - Microcomputer Evaluation and Screening Assessment 23

MOVIEW, Basic VIEW and Micro VIEW 63

Machine Shop Review 175

Mastertype 43

Matching (Figures and Alphabet Letters) 84

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Microchoices 62

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Apple Computer, Inc. (contd.)

Milwaukee Area Technical College, Computer Assisted Drafting 178
Motor Training with Printout of Response, Time and Accuracy 84
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Rendezvous 140
Rent/Own 200
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Spelling Bee and Reading Primer 165
Spelltronics 153
Study Quiz Files 27
Study Quiz Files and Multiple Choice Files 110
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Typing Communication Game 141
Typing Tutor 47
Video Controller for Controlling Interaction Between a Computer and Videotape Player/Recorder and Screen 144
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Apple Computer, Inc. (contd.)

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Work/Study Project 166

Atari, Inc.

Breakeven Crop Fertilization 4
Crop Yield Calculator 5
Edu-Ware Decimals 117
Edu-Ware Fractions 118
Farm Implement Analysis 9
How to Program in the Basic Language 80
MESA - Microcomputer Evaluation and Screening Assessment 23
Sire Mate 16

Commodore Business Machines, Inc.

Alternative Crop Comparison 3
Breakeven Crop Fertilization 4
C.A.I. for Academically Disadvantaged Youth in Phenix City, AL 158
Crop Yield Calculator 5
Factoring Whole Numbers (3 diskettes), Fractions (6) Decimals (4) 120
Farm Implement Analysis 9
How to Program in the Basic Language 80
Microchoices 62
NORPLOT 179
Tachistoscope/Vocabulary 28
VIC Writer 3 142

Digital Equipment

Administrative Planning System^{tm} (APS) . . . 129

A Computer Assisted Instructional Unit on Kitchen Space and Dimensions . . . 93

Curriculum Management System . . . 55

Individualized Planning System^{tm} (IPS) . . . 137

Franklin Computer Corporation

Course Master . . . 76

Video Controller for Controlling Interaction Between a Computer and Videotape Player/Recorder and Screen . . . 144

International Business Machines

Administrative Planning System^{tm} (APS) . . . 129

Alternative Crop Comparison . . . 3

Breakeven Crop Fertilization . . . 4

Course Master . . . 76

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Curriculum Management System . . . 55

Farm Implement Analysis . . . 9

Individualized Planning System^{tm} (IPS) . . . 137

Video Controller for Controlling Interaction Between a Computer and Videotape Player/Recorder and Screen . . . 144

Tandy Corporation

Alternative Crop Comparison . . . 3

Breakeven Crop Fertilization . . . 4

CAIWARE-3D CAI/CMI Authoring System . . . 130

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Tandy Corporation (contd.)

Computerized Accounting System 35

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Introduction to Basic 82

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PART ONE

Microcomputer Programs Used by Practioners

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Crop Yield Calculator 5

Dairy Farm Management 6

F.A.R.M. (Farm Accounting & Records Management) 7

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(ILSKBUD) Livestock Budget 10

LAPS for Vocational Agriculture 11

Microcomputer Applications in Vocational Education:
Agriculture 12

Ohm's Law - Series and Parallel Circuits 13

Oxyacetylene Welding and Related Review 15

Sire Mate 16

Soil Contest-Fertility Training 17

Name of Program ALTERNATIVE CROP COMPARISON

Make and Model of Computer on Which it is Used IBM Personal Computer, VIC-20, Radio Shack TRS-80 Mode I & II and Color Computer

FOR SALE

yes ☒ no ☐

Order from:

Electronics World
Distributing, Inc.
300 S. Vermont
Oklahoma City, OK 73103

DEVELOPER

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

CONTACT PERSON

Electronics World
Distributing, Inc.
300 S. Vermont
Oklahoma City, OK 73108
(405) 946-9059

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

The program determines the breakeven yield and cost between two different crops that could be planted in the same field. The inputs required by the program are: 1) Crop Name; 2) Cost of Population; 3) Expected Crop Yield; and 4) Expected Crop Price for each of the crops. The program is designed to be used in the study of Farm Management Planning.

MODIFICATIONS FOR SPECIAL POPULATIONS

This BASIC computer program is designed to be used by students in high school and college. It is targeted at students in Vocational Agriculture and General Agriculture high school programs, and students in Plant Science or Introductory Field Crops courses at the college level. In addition, the program has general application to on the farm use.

Name of Program BREAKEVEN CROP FERTILIZATION

Make and Model of Computer on
Which it is Used IBM Personal Computer, Atari 400/800, VIC 20, Radio Shack TRS-80 I and II and Color Computer

FOR SALE

yes ☒ no ☐

Order from:

George L. Gille
220 Clayton
Maryville, MO 64468

DEVELOPER

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

CONTACT PERSON

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

The program is designed to be used in Plant Science or Agronomy classes. It will determine the amount of replacement fertilizer required for any of 22 different grain and forage crops. The user need only enter the crop yield and value of the crop to run the program. The program will work with any yield level of any selected crop.

MODIFICATIONS FOR SPECIAL POPULATIONS

This BASIC computer program is designed to be used by students in high school and college. It is targeted at students in Vocational Agriculture and General Agriculture high school programs and beginning college level class.

Name of Program CROP YIELD CALCULATOR

Make and Model of Computer on Which it is Used VIC-20, Atari 400/800, IBM Personal Computer and Radio Shack TRS-80 I & II and Color Computer

FOR SALE

yes ☒ no ☐

Order from:

Electronics World
Distributing, Inc.
300 S. Vermont
Oklahoma City, OK 73103

DEVELOPER

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

CONTACT PERSON

Electronics World
Distributing, Inc.
300 S. Vermont
Oklahoma City, OK 73108
(405) 946-9059

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

The program is an aid in the calculation of the field yields of major crops grown in the U.S. The program can be used on any of eleven different crops, including corn, soybeans and wheat. The program can process data from both hand and machine harvested crops. The program can process as many as fifty different yield checks at a single time. The high, low and average of all the yield checks is also determined. The program can be used to: 1) Illustrate the important measurements necessary in determining crop yields; and 2) In the analysis of crop variety yield experiments.

MODIFICATIONS FOR SPECIAL POPULATIONS

This BASIC computer program is designed to be used by students in high school and college. It is targeted at students in Vocational Agriculture and General Agriculture high school programs, and students in Plant Science or Introductory Field Crops courses at the college level. In addition, the program has general application to on the farm use.

Name of Program DAIRY FARM MANAGEMENT

Make and Model of Computer on Which it is Used Apple II Plus

FOR SALE

yes ☒ no ☐

Order from:

Moraine Park Technical Institute
235 N. National Ave.
Fond du Lac, WI 54935
(414) 922-8611

DEVELOPER

Dr. Fred J. Pumper
Moraine Park Technical Institute
235 N. National Ave.
Fond du Lac, WI 54935
(414) 922-8611

CONTACT PERSON

Betty Wirtz and Fred Pumper
Book Store Manager
Moraine Park Technical Institute
235 N. National Ave.
Fond du Lac, WI 54935
(414) 922-8611

VOCATIONAL AREA(S)

Postsecondary Agriculture students in farming and farm service and supply businesses.

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial
Simulation
Problem Solving

PROGRAM DESCRIPTION

The material is an introduction to the use of the Apple II plus microcomputer. It is a set of instructions combining the use of a Apple II Plus Computer, Apple II User's Guide and a set of 10 floppy disks with programs written at Iowa State, University of Minnesota and from CESA #6 District in Wisconsin plus worksheets for the programs.

MODIFICATIONS FOR SPECIAL POPULATIONS

This material is developed for use by students who have previously completed courses in Farm Management, Soils, Crops, Feeding Dairy Cattle, Farm Machinery and Forage.

Name of Program F.A.R.M. (FARM ACCOUNTING & RECORDS MANAGEMENT)

Make and Model of Computer on Which it is Used Apple II 48K

FOR SALE

yes ☒ no ☐

Order from:

Specialized Data Systems
P.O. Box 8278
Madison, WI 53708

DEVELOPER

Specialized Data Systems, Inc.
P.O. Box 8278
Madison, WI 52708
(608) 241-5050

CONTACT PERSON

Wally Hoffman
P.O. Box 8278
Madison, WI 53708
(608) 241-5050

VOCATIONAL AREA(S)

Agriculture
Secondary & Post-Secondary

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

A single entry cash accounting system that features cashflow projections, checkbook balancing, money borrowed, monthly check register, farm income & expense summary and a schedule F worksheet for use with VisiCalc. Transactions may be categorized for household, personal or by farm enterprise.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program FFA COMPUTER GAME

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

Call contact person for sale information.

DEVELOPER

David Coffey
Dept. of Agriculture
Western KY University
Bowling Green, KY 42101
(502) 745-3151

CONTACT PERSON

David Coffey
Dept. of Agriculture
Western KY University
Bowling Green, KY 42101
(502) 745-3151

VOCATIONAL AREA(S)

Ag. Ed.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

Primarily for teacher ed. students

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Type in name, class, type of questions (areas of study in FFA).
Three chances to guess answer.
Scores on each student recorded.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program FARM IMPLEMENT ANALYSIS

Make and Model of Computer on Which it is Used IBM Personal Computer, Atari 400/800, VIC-20, Radio Shack TRS-80 I and II and Color Computer

FOR SALE

yes ☒ no ☐

Order from:

Electronics World
Distributing, Inc.
300 S. Vermont
Oklahoma City, OK 73103

DEVELOPER

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

CONTACT PERSON

Electronics World
Distributing, Inc.
300 S. Vermont
Oklahoma City, OK 73108
(405) 946-9059

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

The program determines the power requirements, field work capacity, efficiency and breakeven field custom cost of eighteen different common farm implements. The program can be used to: 1) Illustrate cost relationships in farm implement use; 2) Illustrate the work capacity of different size implements; and 3) Examine the size of tractor required for different implements.

MODIFICATIONS FOR SPECIAL POPULATIONS

The BASIC computer program is designed to be used by students in high school and college. It is targeted at students in Vocational Agriculture and General Agriculture high school programs, and students in Plant Science or Introductory Field Crops courses at the college level. In addition, the program has general application to on the farm use.

Name of Program (ILSKBUD) LIVESTOCK BUDGET

Make and Model of Computer on Which it is Used Apple II (EC21); Commodore PET (EC22); TRS-80 ml,3 (EC23).
LANGUAGE-BASIC

FOR SALE

yes ☒ no ☐

Order from:

Cost unknown

DEVELOPER

Audrew Anderson
AAA Ag Services
RR 1 Box 88A
Leland, IL 60531

CONTACT PERSON

Vocational Agricultural Service
434 Mumford Hall
Univ. of Illinois
1301 W. Gregory Dr.
Urbana, IL 61801

VOCATIONAL AREA(S)

Livestock Production

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

n/a

PROGRAM DESCRIPTION

This program is designed to allow the user to evaluate the income and costs of livestock production, allowing for comparing various options.

User develops budget based on a phase of similar management. The phase studied may vary from about a week to a year, as long as average daily feed, etc. is used. Provision is also made for recording daily production of livestock products.

MODIFICATIONS FOR SPECIAL POPULATIONS

Name of Program LAPS FOR VOCATIONAL AGRICULTURE

Make and Model of Computer on
Which it is Used Apple II Plus, 48K

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

William G. Camp
Virginia Polytechnic
Inst. and State Univ.
Div. of Voc. & Tech. Ed.

CONTACT PERSON

William G. Camp
Virginia Polytechnic
Inst. and State Univ.
Div. of Voc. & Tech. Ed.

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Learning Activity
Packages - LAP

PROGRAM DESCRIPTION

Dr. Camps students have developed LAP's using the Apple Pilot author software coursewriting package. LAP titles were selected on the basis of student interest and not on the basis of curriculum or program design, and thus are more random than planned. Representative titles include

1. Sum-of-the-years digits depreciation
2. Straight line depreciation
3. Break even analysis
4. Rooting hardwood cuttings
5. The FFA motto
6. Setting up the chapter meeting room
7. Parts of a LAP
8. Landscaping for energy conservation
9. Taking a soil sample
10. Calculating the area of a triangle

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MICROCOMPUTER APPLICATIONS IN VOCATIONAL EDUCATION: AGRICULTURE

Make and Model of Computer on Which it is Used No. 215A TRS-80 Model III TRS DOS 48K - $8.75; No. 215B Apple II Plus 3.3 DOS 48K - $5.25; No. 215C Pet Basic 3 Commodore 4040 Disk Drive - $5.25; No. 215D Additional Printed Documentation Only - $1.75

FOR SALE

yes ☒ no ☐

Order from:

Curriculum Publications
Clearinghouse
Western Illinois Univ.
Horrabin Hall 46
Macomb, IL 61455

DEVELOPER

Wilma Jean Alexander
Illinois State Univ.
Normal, IL 61761

CONTACT PERSON

James Haire
ISBE/DAVTE
100 N. First St.
Springfield, IL 62777
(217) 782-4620

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

A series of programs designed to demonstrate the use of the microcomputer in the agriculture occupational area. Each set includes all of the programs listed below on one or more 5¼" disks plus one printed documentation. The specific programs are the following:

Income Possibilities
Machinery Decisions
Farm Bookeeping System (TRS 80 only)
Crop Budget
Feeding Program - Livestock Budget
Fertilizer Cost
Greenhouse Heating and Coding
Depreciation
Calibrating Field Sprayers
Soil Loss Equation
Pearson Square Instructions
Pearson Square Calculation
Calculating Calf Weaning Weights
Nitrogen
Grain Marketing
Lawn Planning
Cash Flow

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program OHM'S LAW - SERIES AND PARALLEL CIRCUITS

Make and Model of Computer on Which it is Used Apple II Plus 48K 1 Drive

FOR SALE

yes ☒ no ☐
$29.95

Order from:

Hobar Publications
1234 Tiller Ln.
St. Paul, MN 55112

DEVELOPER

Lloyd Edge and
Donavan Jones
Clinton Community
School District
P.O. Box 566
Clinton, WI 53525
(608) 676-2223

CONTACT PERSON

Donavan Jones
Clinton Community
School District
P.O. Box 566
Clinton, WI 53525
(608) 676-2223

VOCATIONAL AREA(S)

Electricity
Electronics
Agriculture

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Main Menu:
1. OHMS Law
2. Series Circuits
3. Parallel Circuits (2-Registers)
4. Parallel Circuits (3 or more Registers)
5. Series - Parallel Circuits
6. Exit Program

(continued on following page)

Series Menu
1. Complete Series Program
2. Find Series Voltage
3. Find Series Current
4. Find Series Resistance Total
5. Return to Main Menu
6. Exit Program

MODIFICATIONS FOR SPECIAL POPULATIONS

None

OHM'S LAW - SERIES AND PARALLEL CIRCUITS (cont.)

Series - Parallel Circuits Menu
1. To find voltage at a parallel combination when there is a series register.
2. To find the total resistance in a series - parallel circuit
3. To find the current through each parallel resistance.
4. Return to main menu.

The program can be used as an initial instruction tool, a review instrument and a remedial instrument.

Each program ends with several problems for the student to work, with the computer giving immediate reinforcement as to correct or incorrect answer.

Also there is adequate written documentation sent along with program for both student and instructor.

Name of Program OXYACETYLENE WELDING AND RELATED REVIEW

Make and Model of Computer on Which it is Used Apple II Plus 48K DOS 3.3

FOR SALE

yes ☒ no ☐
$29.95
Order from:

Hobar Publications
1234 Tiller Ln.
St. Paul, MN 55112

DEVELOPER

W. Forrest Bear
University of Minn.
St. Paul, MN 55108

CONTACT PERSON

Donavan Jones
Clinton Community School District
P.O. Box 566
Clinton, WI 53525
(608) 676-2223

VOCATIONAL AREA(S)

Welding
Agriculture
Metalworking
General Metals

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Testing and Review

PROGRAM DESCRIPTION

For testing and review with student interaction and immediate reinforcement as to correct or incorrect responses. There are 433 questions covering the following categories: Gas Welding; Cutting and Brazing; Soft Soldering and Silver Soldering; Hand Metal Tools; Metal Properties; and Weld Joints.

There is adequate written documentation sent along with program for both student and instructor.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program SIRE MATE

Make and Model of Computer on Which it is Used Atari

FOR SALE

yes ☒ no ☐

Order from:

Francis McCauley
640 N. Jefferson
Richland Center, WI
(608) 647-3237 53581

DEVELOPER

Francis McCauley
640 N. Jefferson
Richland Center, WI
(608) 647-3237 53581

CONTACT PERSON

Francis McCauley
640 N. Jefferson
Richland Center, WI
(608) 647-3237 53581

VOCATIONAL AREA(S)

Vo-Ag

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

A sheet will include instructions on how to use the program. It is updated twice a year according to the USDA Sire Summary Reports.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

30

Name of Program SOIL CONTEST-FERTILITY TRAINING

Make and Model of Computer on Which it is Used TRS-80 Model I & III

FOR SALE

yes ☒ no ☐

Order from:

George L. Gille
220 Clayton
Maryville, MO 64468

DEVELOPER

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

CONTACT PERSON

Dr. George L. Gille
Ag. Dept.
Northwest Mo. State Univ.
Maryville, MO 64468
(816) 562-1155

VOCATIONAL AREA(S)

Agriculture

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The program helps the student in accurately solving problems involved in the Missouri FFA Soil Judging Contest Scorecard. The program is designed to give the student tutorial practice in the area of Soil Test Interpretation (Soil Chemistry).

MODIFICATIONS FOR SPECIAL POPULATIONS

This BASIC computer program is designed to be used by students in high school and college. It is targeted at students in Vocational Agriculture and General Agriculture high school programs and beginning college level class.

ASSESSMENT

"MAT" Make Me a Test 21
MESA - Microcomputer Evaluation and Screening Assessment 23
Multiple Choice Files 24
Multiple Choice Questions 25
Quick Quiz - Pilot Plus 26
Study Quiz Files 27
Tachistoscope/Vocabulary 28
WRIOT Scoring 29
Wide Range Interest and Opinion Test--Test Scorer 30

Name of Program "MAT" MAKE ME A TEST

Make and Model of Computer on Which it is Used Apple II, with Chatsworth 500 or Mountain 1100A card reader

FOR SALE

yes ☒ no ☐

Order from:

Dr. Page Crouch
203 Freeman Hall
Clemson Univ.
Clemson, SC 29631
(803) 656-3455

DEVELOPER

Clemson University
Industrial Education Div.
203 Freeman Hall
Clemson Univ.
Clemson, SC 29631
(803) 656-3455

CONTACT PERSON

Dr. Page Crouch
203 Freeman Hall
Clemson Univ.
Clemson, SC 29631
(803) 656-3455

VOCATIONAL AREA(S)

Presently being developed in graphics suitable to all vocational T and I programs.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Curriculum Development and Evaluation

PROGRAM DESCRIPTION

"MAT," short for MAKE A TEST, is a program used for building and storing tests. MAT was created specifically to reduce test preparation hassles and save time.

Developed at Clemson University, in cooperation with the PICA (Printing Industries of the Carolinas) Foundation, MAT will be released to field test sites across the nation in the Fall of 1983.

What MAT does:

MAT combines question selection and typing into a single operation. The program provides the format so a teacher or assistant can rapidly enter short answer, true/false, multiple choice, and essay questions into a "questions bank" on a disk. (continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Pop quizzes are set up with items drawn from the "question bank." Longer exams can be prepared in less than a half hour. Past tests and quizzes stored on the disk may be recalled for editing and updating. With MAT, for the first time, changes to questions, deletions and additions can be made moments before test time.

MAT completely eliminates time lost at a typewriter fussing with margins and tabs, or correcting spirit mimeos.

Hardware required:

Many schools are just getting into microcomputers and MAT was designed with this in mind. The only hardware required is a microcomputer, a single disk drive, and a printer capable of 80 characters per line.

MAT was created with the idea that many teachers will use the program although there may be only one computer in a school.

MAT runs presently on a 48K Apple II Plus computer.

Easy to use.

Because many teachers do not have the time or inclination to learn computer programming, MAT has built in features that make it easy for them.

MAT is menu driven. This is the method of choice for novice users. MAT has extensive error trapping. Simply put, the program will not "blow up" if the user does the "wrong" thing. Help and error messages provide direction and recommendation for corrective action.

MAT is "self-documenting." This means directions for using the program are on the screen when the user needs them. "Self-documenting" programs are easy to learn.

Name of Program MESA - MICROCOMPUTER EVALUATION AND SCREENING ASSESSMENT

Make and Model of Computer on
Which it is Used Apple II & II+, Atari 400/800

FOR SALE

yes ☒ no ☐

Order from:

Valpar International
Corp.
3801 E. 34th St.
Tucson, AZ 85713
(602) 790-7141

DEVELOPER

Valpar
3801 E. 34th St.
Tucson, AZ 85713
(602) 790-7141

CONTACT PERSON

Tom Brandon
Valpar
3801 E. 34th St.
Tucson, AZ 85713
(602) 790-7141

VOCATIONAL AREA(S)

All

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Assessment

PROGRAM DESCRIPTION

MESA can be used by teachers, counselors and assessment personnel to measure physical, academic, intellectual skills as well as vocational interests and awareness.

MESA consists of six parts 1) Vocational Screening, Gross Skills; 2) Vocational Thinking and Problem Solving; 3) Vocational Screening, Fine Skills; 4) Motor Sensory Integration; 5) Vocational Interests; and 6) Microcomputer Screening.

Parts One to Five allows for the screening of four individuals at one time, using work sample techniques. These parts of MESA can be completed and scored in approximately one hour. Part Six of MESA is conducted with one person at a time, using an Apple or Atari microcomputer. This part can be completed and scored in less than one hour per individual.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MULTIPLE CHOICE FILES

Make and Model of Computer on Which it is Used Apple II, II+, IIe

FOR SALE

yes ☒ no ☐

Order from:

Gamco Industries, Inc.
Box 310 P
Big Spring, TX 49720-0120

DEVELOPER

Compu-tations
P.O. Box 502
Troy, MI 48099

CONTACT PERSON

Jim Jensen
Portage High School
2505 New Pinery Rd.
Portage, WI 53901
(608) 742-2165

VOCATIONAL AREA(S)

Any vocational area where multiple choice questions are appropriate

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

A teacher authoring program that allows the teacher to create and run multiple choice tests, save them on the disk and retrieve them at will. Up to 30 questions per test may be written. Tests may be revised, added to, and deleted without any computer programming kinwledge. The program includes random question presentation, reinforcement of correct answers with a display of the students name, immediate right answer feedback after incorrect responses, a color congratulations display at the end, and a final score summary.

MODIFICATIONS FOR SPECIAL POPULATIONS

The teacher can program test items with up to five multiple choice answers which pertain to information presented in the student's vocational education class. The program allows students to work independently, select the appropriate test and run it with little or no supervision. The EEN student can receive the repetition that he/she needs to retain information presented. An excellent way to review for upcoming tests or even take tests.

Name of Program MULTIPLE CHOICE QUESTIONS

Make and Model of Computer on Which it is Used Texas Instruments 99/4 and 99/4a

FOR SALE

yes ☒ no ☐

Order from:

Claire Gelinas Associates
27 Norwood St.
Albany, NY 12203

DEVELOPER

Claire Gelinas Association
27 Norwood St.
Albany, NY 12203

CONTACT PERSON

Claire Gelinas
27 Norwood St.
Albany, NY 12203

VOCATIONAL AREA(S)

All

FOR WHICH STUDENTS

Disadvantaged
Handicapped
(emotionally & socially)

PROGRAM FORMAT

Drill and Practice You can Write for your own students

PROGRAM DESCRIPTION

You send us three typical multiple choice questions of the kind you want to program.

We put your questions on our disk.

We send you directions on how to put the rest of your questions on disk.

You can put up to 300 questions on a disk.

IF YOU WANT TO PAY EXTRA, we will put all your questions on the disk.

HOWEVER, the point is that you can easily edit the program any way you want.

The disk program is designed to make it easy for you to build up a library of many disks.

MODIFICATIONS FOR SPECIAL POPULATIONS

We have developed many special programs for special populations. You are entitled to contribute to or borrow from this library once you have the initial disk program.

We let you decide how many repetitions you want. For example, an unlimited number for the retarded.

Name of Program QUICK QUIZ - PILOT PLUS

Make and Model of Computer on Which it is Used TRS-80

FOR SALE

yes ☒ no ☐

Order from:

Radio Shack

DEVELOPER

Radio Shack Education Division
1600 One Tandy Center
Fort Worth, TX 76102
(817) 390-3832

CONTACT PERSON

Any Radio Shack handling microcomputers.

VOCATIONAL AREA(S)

The two above mentioned programs can be used by all the vocational areas and at all levels of students.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Testing

PROGRAM DESCRIPTION

The Quick Quiz allows you to develop questions (true/false, multiple choice) that a student can respond to over subject matter which has been taught. Each test can have up to 40 items and if multiple choice up to four distractors per question. The quick quiz allows for development of tests, editing of tests, printing of results of each test, printouts of each test and printouts of test results. The level of difficulty for each test developed is up to the individual teacher (programmer). Anyone can develop the questions to be asked (even the slower students).

Pilot Plus is designed to enable teachers without previous computer experience to create their own computer assisted instruction courseware.

MODIFICATIONS FOR SPECIAL POPULATIONS

The only modifications that would apply to these two programs would all be dependent upon what the teacher feels is necessary. The only real modifications would be in the calibar of testing or level of development of the computer assisted instruction.

Name of Program STUDY QUIZ FILES

Make and Model of Computer on Which it is Used Apple II, II+, IIe

FOR SALE

yes ☒ no ☐

Order from:

Gamco Industries, Inc.
Box 310 P
Big Spring, TX 79720-0120

DEVELOPER

Compu-tations
P.O. Box 502
Troy, MI 48099

CONTACT PERSON

Jim Jensen
Portage High School
2505 New Pinery Rd.
Portage, WI 53901
(608) 742-2165

VOCATIONAL AREA(S)

Any vocational area where terms and definitions need to be learned.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

A teacher authoring program that allows the teacher to create and run quizzes, save them on the disk and retrieve them at will. Up to 30 questions per quiz may be written. The program includes random question presentation, reinforcement of correct answers with a display of the students name, immediate right answer feedback after incorrect responses, a color congratulations display at the end, and a final score summary.

MODIFICATIONS FOR SPECIAL POPULATIONS

The teacher can program terms and definitions relevant to the vocational class in which the student is enrolled. The program allows students to work independently, select the appropriate quiz and run it with little or no supervision. The EEN student can receive the repetition that he/she needs to retain the information presented. An excellent way to review for upcoming tests.

Name of Program TACHISTOSCOPE/VOCABULARY

Make and Model of Computer on Which it is Used PET 4016

FOR SALE

yes ☐ no ☐

Order from:

Free (after buying book)

DEVELOPER

From Book 32 Basic Programs for the Pet Computer

CONTACT PERSON

Bill Murphy
Addison Co. Voc. Ctr.
Middlebury, VT 05753
(802) 388-3115

VOCATIONAL AREA(S)

Can be modified for any - have set them up for food service and auto mechanics.

FOR WHICH STUDENTS

Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

TACHISTOSCOPE - Is a series of words and phrases that are flashed on the screen and the student must type out what he sees. It starts at 1 second and drops off 5/100 of a second for each correct response. Can be modified for any grouping of words and phrases. VOCABULARY is a series of multiple choice questions that very quickly can be modified or adapted to any vocational program.

MODIFICATIONS FOR SPECIAL POPULATIONS

Can be changed easily and rapidly for the individual student.

Name of Program WRIOT SCORING

Make and Model of Computer on Which it is Used TRS-80 Model III

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Pamela A. Richard
Dir. of Voc. Special Services
Somersworth High School
Memorial Dr.
Somersworth, NH 03873
(603) 692-2431

CONTACT PERSON

Pamela A. Richard
Dir. of Voc. Special Services
Somersworth High School
Memorial Dr.
Somersworth, NH 03873
(603) 692-2431

VOCATIONAL AREA(S)

Vocational Resource Room

FOR WHICH STUDENTS

- Handicapped
- Disadvantaged
- Slow Learner

PROGRAM FORMAT

Test Scoring

PROGRAM DESCRIPTION

This is for scoring the Wide Range Interest and Opinion Test, which is a picture interest inventory. Scoring is generally quite time consuming. Here, the student still uses the picture booklet, then types an A, B, or C response on the computer. The computer calculates the raw score, then prints the score on the screen or printer.

MODIFICATIONS FOR SPECIAL POPULATIONS

Name of Program WIDE RANGE INTEREST AND OPINION TEST--TEST SCORER

Make and Model of Computer on
Which it is Used Apple II+

FOR SALE

yes ☐ no ☒

Order from:

Free. Send a disk, we will copy.

DEVELOPER

Michael P. Hansen
Concord Voc. Center
Warren St.
Concord, NH 03301
(603) 228-1741

CONTACT PERSON

Michael P. Hansen
Concord Voc. Center
Warren St.
Concord, NH 03301
(603) 228-1741

VOCATIONAL AREA(S)

Vocational Assessment

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Assessment

PROGRAM DESCRIPTION

The WRIOT test is a forced choice test of a person's vocational interests. It is usually taken by filling little dots on an answer sheet for 150 items. The test would normally then be scored by hand using a series of 24 overlays. That would take a long time, and in taking it by hand the person can make mistakes. With this series of three linked programs and the testee takes the test by making entries into the computer. The test is then saved and scored in less than 3 minutes. The person being tested has the option of stopping in the middle of a test and continuing from the same point later. No errors can be made by the taker.

MODIFICATIONS FOR SPECIAL POPULATIONS

Use of a large or modified keyboard would be beneficial (only 4 keys are used by the person being tested).

BUSINESS

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Computing Cash Discounts 36

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Microcomputer Applications in Vocational Education:
Business, Marketing and Management 44

Tulsa County Area Vo-Tech 45

Typing 46

Typing Tutor 47

Written Communication Series: Module I: Parts of Speech;
Module II: The Sentence 48

Name of Program ACCOUNTING AND COMPUTING

Make and Model of Computer on
Which it is Used Inter Tec Super Brain

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Ms. Rebecca Johnson
Ms. Carol Winnett
Pioneer JVSD
PO Box 309
Shelby, OH 44875
(419) 347-7926

CONTACT PERSON

Ms. Rebecca Johnson
Ms. Carol Winnett
Pioneer JVSD
PO Box 309
Shelby, OH 44875
(419) 347-7926

VOCATIONAL AREA(S)

Accounting and Computing
Word Processing-Adult Classes
Payroll and General Ledger

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial
Simulation
Problem Solving

PROGRAM DESCRIPTION

Introduce by short course, manually then with computer. Analyze material for accuracy and content and for meaning.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program CHANGE MAKER

Make and Model of Computer on
Which it is Used Apple IIe and II+

FOR SALE

yes ☒ no ☐

Order from:

Opportunities for
Learning, Inc.
8950 Lurline Ave.
Chatsworth, CA 91311
(213) 341-2535

DEVELOPER

n/a

CONTACT PERSON

Christine Krueger
Franklin High School
8222 S. 51st St.
Franklin, WI 53132
(414) 421-3000

VOCATIONAL AREA(S)

Sales and Retailing
Consumer Skills

FOR WHICH STUDENTS

Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Problem Solving

PROGRAM DESCRIPTION

Sales amount given and student must make correct change for amount given as payment - some programs simulate cash register drawer.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COMPUTERIZED ACCOUNTING SYSTEMS

Make and Model of Computer on Which it is Used TRS 80 Model II

FOR SALE

yes ☒ no ☐

Order from:

Dr. Robert Franks
Western WI Tech. Inst.
6th & Vine Sts.
LaCrosse. WI 54601
(608) 785-9167

DEVELOPER

James Squier
Western WI Tech. Inst.
6th & Vine Sts.
LaCrosse, WI 54601
(608) 785-9167

CONTACT PERSON

James Squier or
Dr. Robert Franks
Western WI Tech. Inst.
6th & Vine Sts.
LaCrosse, WI 54601
(608) 785-9167

VOCATIONAL AREA(S)

Accounting

FOR WHICH STUDENTS

Accounting students (95%)
Finance, Marketing, etc. (5%)

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

5th & 6th quarter accounting students are involved in this class. It is now a requisite for the Accounting student to graduate from the school of accounting. A student is given a hypothetical business entity and records the cash disbursements and receipts in the G/L for one months activity. Adjusting entries are also required and the printouts are graded by the instructor. Mr. Squier has prepared a 75 page book on the subject. Price $5.00

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COMPUTING CASH DISCOUNTS

Make and Model of Computer on Which it is Used Apple II Plus - DOS 3.3

FOR SALE

yes ☒ no ☐

Order from:

North Carolina Rural
Renaissance Consortium
P.O. Box 35009
Charlotte, NC 28235
(704) 373-6424

DEVELOPER

Kathy Munday
Edgecombe Tech. College
Tarboro, NC 27886
(919) 823-5166

CONTACT PERSON

Dr. Norman H. Petty
North Carolina Rural
Renaissance Consortium
Central Piedmont
Community College
P.O. Box 35009
Charlotte, NC 28204
(704) 373-6424

VOCATIONAL AREA(S)

Business
Administration

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

Gives tutorial instruction on computing cash discounts. Practice is provided for in a simulated work situation. (5¼" floppy disk: Apple II compatible)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COPYFITTING

Make and Model of Computer on Which it is Used Apple II+

FOR SALE

yes ☐ no ☒

Order from:

Free. Send a disk, we will copy.

DEVELOPER

Michael P. Hansen
Concord Voc. Center
Warren St.
Concord, NH 03301
(603) 228-1741

CONTACT PERSON

Michael P. Hansen
Concord Voc. Center
Warren St.
Concord, NH 03301
(603) 228-1741

VOCATIONAL AREA(S)

Grahpic Arts/Printing

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

Provides an easy method of determining the number of pages needed to fit a given amount of typewritten copy. Use in printing production.
(continued on following pages)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

COPYFITTING (contd.)

```
]LIST

1  GOTO 10
5  INVERSE : PRINT "VALUE IS OUT
    OF RANGE, TRY AGAIN.": NORMAL
    : RETURN
10  HOME
20  VTAB 6: PRINT "THIS PROGRAM A
    IDS IN CALCULATING THE"
30  PRINT "NUMBER OF PAGES NEEDED
     TO SET COPY FROM"
40  PRINT "A TYPEWRITTEN ORIGINAL
    ."
50  PRINT : PRINT  TAB( 8)"<PRESS
     ANY KEY TO BEGIN>";: GET AN
    $
100  HOME
110  INVERSE : HTAB 4: PRINT "AFT
     ER EACH ENTRY PRESS <RETURN>
     .": NORMAL
120  PRINT "IS THE ORIGINAL PICA
     OR ELITE TYPE?"
130  PRINT "(ENTER 1 FOR PICA OR
     2 FOR ELITE):"
135  PRINT : PRINT "HOW LONG IS T
     HE AVG. LINE (INCHES)?"
140  PRINT : PRINT "HOW MANY FULL
      PAGES?"
150  PRINT : PRINT "HOW MANY PART
     IAL PAGES?"
160  PRINT : PRINT "HOW MANY LINE
     S IN A FULL PAGE?"
170  PRINT : PRINT "HOW MANY LINE
     S IN A PARTIAL PAGE?"
180  PRINT : PRINT "WHAT IS THE L
     ENGTH OF THE LINE TO BE SET"
     ;
190  PRINT "IN PICAS?"
200  PRINT : PRINT "HOW MANY CHAR
     ACTERS PER PICA?"
210  PRINT : PRINT "WHAT IS THE D
     EPTH OF THE PAGE TO BE SET"
220  PRINT "IN INCHES?"
230  PRINT : PRINT "WHAT IS THE D
     EPTH OF ONE LINE OF TYPE"
240  PRINT "(INCLUDING LEADING) I
     N POINTS?":
300  VTAB 3: HTAB 37: INPUT "";TY
     PE
303  IF TYPE <  > 1 AND TYPE <  >
     2 THEN  VTAB 4: HTAB 1: INVERSE
     : PRINT "YOU MUST USE A 1 OR
      A 2" : NORMAL : GOTO 300
```

BEST COPY AVAILABLE

COPYFITTING (contd.)

```
310  VTAB 4: HTAB 1: CALL  - 868
315  IF TYPE = 1 THEN TYPE = 10
320  IF TYPE = 2 THEN TYPE = 12
325  VTAB 5: HTAB 37: INPUT "";LI
     NE
330  IF LINE < 0 OR LINE > 12 THEN
      VTAB 6: HTAB 1: GOSUB 5: GOTO
     325
335  VTAB 6: HTAB 1: CALL  - 868
340  VTAB 7: HTAB 25: INPUT "";FU
     LL
345  IF FULL < 0 OR FULL > 9999 THEN
      VTAB 8: HTAB 1: GOSUB 5: GOTO
     340
350  VTAB 8: HTAB 1: CALL  - 868
355  VTAB 9: HTAB 25: INPUT "";PA
     RT
360  IF PART < 0 OR PART > 9999 THEN
      VTAB 10: HTAB 1: GOSUB 5: GOTO
     355
365  VTAB 10: HTAB 1: CALL  - 868

370  VTAB 11: HTAB 35: INPUT "";L
     F
375  IF LF < 0 OR LF > 80 THEN  VTAB
     12: HTAB 1: GOSUB 5: GOTO 37
     0
380  VTAB 12: HTAB 1: CALL  - 868

385  VTAB 13: HTAB 35: INPUT "";L
     P
390  IF LP < 0 OR LP > 80 THEN  VTAB
     14: HTAB 1: GOSUB 5: GOTO 38
     5
395  VTAB 14: HTAB 1: CALL  - 868

400  VTAB 16: HTAB 11: INPUT "";L
     S
410  IF LS < 1 OR LS > 1000 THEN
      VTAB 17: HTAB 1: GOSUB 5: GOTO
     400
415  VTAB 17: HTAB 1: CALL  - 868

420  VTAB 18: HTAB 31: INPUT "";C
     PP
425  IF CPP < 0 OR CPP > 5 THEN  VTAB
     19: HTAB 1: GOSUB 5: GOTO 42
     0
430  VTAB 19: HTAB 1: CALL  - 868

435  VTAB 21: HTAB 12: INPUT "";D
     I
440  IF DI < 0 OR DI > 36 THEN  VTAB
     22: HTAB 1: GOSUB 5: GOTO 43
     5
```

BEST COPY AVAILABLE

COPYFITTING (contd.)

```
445  VTAB 22: HTAB 1: CALL  - 868

450  VTAB 24: HTAB 32: INPUT "";D
     P
455  IF DP < 6 OR DP > 80 THEN  VTAB
     22: HTAB 1: GOSUB 5: GOTO 45
     0
500  HOME
510 CL = TYPE * LINE
520 CF = CL * LF * FULL
530 C2 = CL * LP * PART
540 C = C2 + CF
550 CT = CPP * LS
560 LT = C / CT
570 P = 72 * DI
580 X = P / DP
590 PAGES = LT / X
600 PAGE$ =  STR$ (PAGES)
610  IF  LEN (PAGE$) > 4 THEN PAG
     E$ =  LEFT$ (PAGE$,4)
620  VTAB 9: PRINT "YOU NEED "PAG
     E$" PAGES TO PRINT THE COPY.
     "
630  PRINT "THIS CAN BE ROUNDED U
     P TO " INT (PAGES + .999)" P
     AGES."
640  PRINT : PRINT "DO YOU WANT T
     O DO ANOTHER PROBLEM? ";: GET
     AN$
650  IF AN$ = "Y" THEN  GOTO 100
660  HOME
670  VTAB 12: HTAB 1: PRINT "TO R
     ETURN TO DISC MENU PRESS ANY
      KEY";: GET AN$
680  HOME : VTAB 12: HTAB 8: PRINT
     "GETTING DISC MENU . . ."
690  PRINT  CHR$ (4);"RUN MENU"

PR#0
```

BEST COPY AVAILABLE

Name of Program DISCOVER BASIC: PROBLEM SOLVING WITH THE APPLE COMPUTER

Make and Model of Computer on
Which it is Used Apple II & II plus

FOR SALE

yes ☒ no ☐

Order from:

Sterling Swift Pub. Co.
1600 Fortview Rd.
Austin, TX 78704
(512) 444-7570

DEVELOPER

Sterling Swift
1600 Fortview Rd.
Austin, TX 78704
(512) 444-7570

CONTACT PERSON

Sterling Swift/
Wayne Roe
1600 Fortview Rd.
Austin, TX 78704
(512) 444-7570

VOCATIONAL AREA(S)

Office Training
Programming

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial
Problem Solving

PROGRAM DESCRIPTION

DISCOVER BASIC

1) Title: Discover BASIC: Problem Solving with the Apple II Computer.
2) Publisher: Sterling Swift Publishing Co., 1600 Fortview Rd. Austin, TX 78704
3) Author: Rick Thomas
4) Grade Level: 8-14 and teachers
5) Number of Programs: 34
6) Hardware: Apple II Plus, DOS 3.3, 32K, video monitor, printer optional.
7) Price: $74.95 Teacher's Guide and Materials. $5.95 Student Workbook
   Extra copies of student demonstrations disk, $19.95

(continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

8) Description: A comprehensive hands-on introduction to programming and problem solving. Promotes personal hand-and-mind involvement. Stresses stepwise approach to problem solving. Uses demonstrations disk for student experimentation.
9) Instructional Strategies: The instructional strategies for this program are inquiry, drill and practice, and problem solving.
10) Student/Teacher Instructional Documentation: The available student/teacher instructional documentation for the use of this program includes sample program run, program operating, instructions, teacher's guide, student's manual, and follow-up.
11) Strengths: The strengths of this program: Teacher's Guide contains a student demonstrations disk, a solutions disk for the teacher, a listing of the student demo programs, and a student workbook with key. The student workbook includes experiments as well as "Do you understand" questions.

Name of Program MASTERTYPE

Make and Model of Computer on
Which it is Used Apple II+ and IIe

FOR SALE

yes ☒ no ☐

Order from:

Lightning Software
P.O. Box 11725
Palo Alto, CA 94306

DEVELOPER

n/a

CONTACT PERSON

Christine Krueger
Franklin High School
8222 S. 51st St.
Franklin, WI 53132
(414) 421-3000

VOCATIONAL AREA(S)

Typing

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

Video game format for typing drill - can determine level of difficulty and speed of performance.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MICROCOMPUTER APPLICATIONS IN VOCATIONAL EDUCATION: BUSINESS, MARKETING AND MANAGEMENT

Make and Model of Computer on Which it is Used No. 216A TRS-80 Model III TRS DOS 48K - $8.50; No. 216B Apple II Plus 3.3 DOS 48K - $4.75; No. 216C Pet Basic 3 Commodore 4040 Disk Drive - $4.75; No. 216D Additional Printed Documentation Only - $1.50

FOR SALE

yes ☒ no ☐

Order from:

Curriculum Publications
Clearinghouse
Western Illinois Univ.
Horrabin Hall 46
Macomb, IL 61455

DEVELOPER

Wilma Jean Alexander
Illinois State Univ.
Normal, IL 61761

CONTACT PERSON

James Haire
ISBE/DAVTE
100 N. First St.
Springfield, IL 62777
(217) 782-4620

VOCATIONAL AREA(S)

Business, Marketing and Management

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

A series of programs designed to demonstrate the use of the microcomputer in the business, marketing and management occupational area. Each set includes all of the programs listed below on one or more 5¼" disks plus one printed documentation. The specific programs are the following:

- Critical Path Method
- Capitol Funding
- Inventory Analysis
- Production Method Comparisons
- Income Tax Reduction
- Depreciation Analysis
- Present Future Value
- Name and Address Processing
- Financial Ratio Analysis
- Comparative Analysis Purchase of Auto
- Return on Investment
- Expected Value Computations
- Job Pricing/Bidding
- Equipment Purchase
- Business Forecasting
- Breakeven Analysis
- Lease/Buy

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program TULSA COUNTY AREA VO-TECH

Make and Model of Computer on Which it is Used TRS 80; Lanier Word Processor, PISCO, Apple II

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Peoria Campus
3802 N. Peoria
Tulsa, OK 74106
(918) 428-2261

CONTACT PERSON

Dr. T. J. Allen
3802 N. Peoria
Tulsa, OK 74106
(918) 428-2261

VOCATIONAL AREA(S)

Banking Services
Medical Transcription
Business/Accounting
Business & Office
Machine Shop
Reading

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial
Simulation
Problem Solving
Skills related

PROGRAM DESCRIPTION

Prepared self-paced, soft-ware

MODIFICATIONS FOR SPECIAL POPULATIONS

Instructors develop their own software for their programs.

Name of Program TYPING

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☐ no ☒

Order from:

Microsoft
400 108th Ave.
Bellevue, WA 98009

DEVELOPER

n/a

CONTACT PERSON

Kathy T. Witherup
Withrow High School
2488 Madison Rd.
Cincinatti, OH 45208
(513) 871-1825 #65

VOCATIONAL AREA(S)

Typing

FOR WHICH STUDENTS

Regular
Disadvantaged

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Typing is used for handicapped students - practice, drill and tutorial - Teacher sees improvement in business class.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program TYPING TUTOR

Make and Model of Computer on Which it is Used Apple II, II+, IIe

FOR SALE

yes ☒ no ☐

Order from:

K-12 Micro Media
P.O. Box 17/Dept. 13579
Valley Cottage, NY 16989

DEVELOPER

Microsoft Consumer Products
10700 Northrup Way
C-97200
Bellevue, WA 98004

CONTACT PERSON

Jim Jensen
Portage High School
2505 New Pinery Rd.
Portage, WI 53901
(608) 742-2165

VOCATIONAL AREA(S)

Business Education

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The Typing Tutor II program provides an individualized teaching device for learning or increasing typing or word processing skills. Typing tutor has four levels of typing proficiency from beginning to advanced. Time response monitoring, a system for monitoring the keyboard and analyzing skills and progress, keeps track of the keys learned, those currently being taught, and those yet to be learned. All performance factors are tabulated for immediate feedback, including speed, accuracy, number of errors and "troublesome keys." The progress of up to 49 students can be recorded and reviewed.

MODIFICATIONS FOR SPECIAL POPULATIONS

Used with EEN students during or after enrollment in business education classes to increase and maintain typing skills.

Name of Program WRITTEN COMMUNICATION SERIES: MODULE I: PARTS OF SPEECH; MODULE II: THE SENTENCE

Make and Model of Computer on Which it is Used Apple II Plus; Apple IIe

FOR SALE

yes ☒ no ☐

Order from:

Instructional Materials Laboratory
10 Industrial Education Building; UM-C

DEVELOPER

Instructional Materials Laboratory
10 Industrial Ed. Bldg.
Univ. of Missouri
(314) 882-2883

CONTACT PERSON

Phyllis Miller
10 Industrial Ed. Bldg.
Univ. of Missouri
(314) 882-2883

VOCATIONAL AREA(S)

Business and Office

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Written Communications is a curriculum series that contains the following 5 modules: 1) Parts of Speech, 2) The Sentence, 3) Punctuation, Capitalization, and Abbreviations, 4) Spelling and Vocabulary, and 5) Proofreading, Composing, and Editing. Teacher and student packets are available in this series. Computer-assisted instruction (CBI) has been developed and is available for Modules 1 and 2. Slides and tapes are also available for each of the modules. These various instructional medias, therefore, give this curriculum series great flexibility when working with the student. (continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

WRITTEN COMMUNICATIONS SERIES (contd.)

When using the computer-assisted instruction, the teacher first goes over the objectives with the student. Then the student is asked to read the information sheets. At the end of certain sections, the student is directed to use the computer to complete assignment sheets that relate to the information sheet just read. The CBI materials have built-in loops that recycle the student through problem areas in order to facilitate learning. Scores are listed after each assignment sheet. A separate test disk holds the test questions. Each module test disk has one pretest and 2 posttests. There are 3 options on this disk: 1) to create new files, 2) to review student records, and 3) to administer pretests or posttests.

CAREER EDUCATION

Career Basic 53

Career Program 54

Curriculum Management System 55

Job Hunter's Survival Kit 56

Job Hunter's Survival Kit/a work values program is under development 57

Kansas Careers 60

Microchoices 62

MOVIEW, Basic VIEW and Micro VIEW 63

Oklahoma Micro-VIEW 65

Search and Learn 66

South Carolina Occupational Information System 69

Virginia View 70

Name of Program CAREER BASIC

Make and Model of Computer on Which it is Used TRS-80 Model III

FOR SALE

yes ☒ no ☐

Order from:

Educational Activities

DEVELOPER

Dorak Industries
P.O. Box 175
Beecher Falls, VT 05902
(802) 266-3582

CONTACT PERSON

Norma Chenevert
Colebrook Academy
Box 119
Colebrook, NH 13576
(603) 237-8351

VOCATIONAL AREA(S)

Career exploration using the SQP, WIG, and DOT.

FOR WHICH STUDENTS

Handicapped
Disadvantaged

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Students with reading and math academic problems often have difficulty in all their programs.

I also use computer games to motivate, practice organizational skills and to plan ahead.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program CAREER PROGRAM

Make and Model of Computer on Which it is Used Apple II+ (48K) Disk

FOR SALE

yes ☐ no ☒

Order from:

Swap or copy for request

DEVELOPER

James Mullarkey
4333 S. Sunny Slope Rd.
New Berlin, WI 53151
(414) 782-3700

CONTACT PERSON

James Mullarkey
4333 S. Sunny Slope Rd.
New Berlin, WI 53151
(414) 782-3700
(414) 786-1330

VOCATIONAL AREA(S)

Career Awareness

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Survey

PROGRAM DESCRIPTION

This program was designed to assess an individuals interests, and general career desires and list those occupations which match the ten point survey.

Although a file system and printout are available, a student activity sheet is used to stimulate and direct further research on the identified career areas.

MODIFICATIONS FOR SPECIAL POPULATIONS

Modification for light beam pointer are in process as well as voice synthesis--"Voice"^{R} and "Sweet Talker"^{R}. Printer setup for Epson with easy potential for modification.

Name of Program CURRICULUM MANAGEMENT SYSTEM

Make and Model of Computer on Which it is Used Apple II & III, IBM PC, DEC 325 & 350

FOR SALE

yes ☒ no ☐

Order from:

Learning Tools
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086 or local software distributor

DEVELOPER

Learning Tools
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086

CONTACT PERSON

Joan Thormann
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086

VOCATIONAL AREA(S)

Curriculum and resource management

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Curriculum and resource management.

PROGRAM DESCRIPTION

CMS centralizes and coordinates all instructional resources. It is adaptable and easily used by non-technical staff. CMS files can be used with the Individualized Planning System tm for convenient individualized goal planning and for generating student/client reports such as IEPs, IWRPs and ISPs.

This program can be used by administrators, teachers, counselors, clinicians and curriculum developers.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program JOB HUNTER'S SURVIVAL KIT

Make and Model of Computer on Which it is Used Apple (48K)

FOR SALE

yes ☒ no ☐

Order from:

Computer Concepts
2909 Brandemere Dr.
Tallahassee, FL 32312
(904) 385-6717

DEVELOPER

Computer Concepts
2909 Brandemere Dr.
Tallahassee, FL 32312
(904) 385-6717

CONTACT PERSON

Ida Ake
2909 Brandemere Dr.
Tallahassee, FL 32312
(904) 385-6717

VOCATIONAL AREA(S)

Career Guidance
Employability Skills

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Tutorial - to some extent

PROGRAM DESCRIPTION

Job Hunters Survival Kit consists of two separate programs: The Skill Analyzer and the Creative Resume Guide. A demo disk will be available soon.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program JOB HUNTER'S SURVIVAL KIT/a work values program is under development

Make and Model of Computer on Which it is Used Apple II and TRS 80

FOR SALE

yes ☒ no ☐

Order from:

Computer Concepts
2909 Brandemere Dr.
Tallahassee, FL 32312

DEVELOPER

Ida Ake
2909 Brandemere
Tallahassee, FL 32312
(904) 385-6717

CONTACT PERSON

Ida Ake
2909 Brandemere
Tallahassee, FL 32312
(904) 385-6717

VOCATIONAL AREA(S)

Career guidance
Employability skills

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Tutorial
Interactive

PROGRAM DESCRIPTION

The most crucial part of a job search is knowing what skills you have to offer an employer and presenting these skills in a resume designed for maximum impact. The JOBHUNTERS SURVIVAL KIT does just that - the SKILL ANALYZER helps an individual identify and emphasize specific job skills and the CREATIVE RESUME GUIDE allows them to custom design a resume for each specific job.

These programs were designed for all Jobhunters and Career Changers, regardless of age, educational background or work experience. The JOBHUNTERS SURVIVAL KIT was designed to make anyone's job search more successful and is appropriate for anyone looking for a job, such as: (continued on following pages)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

- Students
- Displaced Homemakers/Returning Women
- Career Changers
- Volunteer Workers
- Handicapped/Special Populations

Skill Analyzer

Program Options:

- Introduction - Includes a discussion of what is meant by skill analysis and why it is important to know what skills you have.
- Skill Analysis - The interactive section containing a step-by-step procedure which takes any job or experience (either paid or volunteer) and references it to 43 skill areas. If a particular skill was used in the job listed, you have the option of typing a brief description of the skills used in that skill area before proceeding to the next skill area. The individual may even add additional skill areas if desired. This sequence is repeated for each job.
- Review of each job entered and the skill areas used in that job
- Review each skill area and the skill descriptions within each. If the same skill has been used in several different jobs, the computer will search each job file and compile the descriptions from each identical skill area into one list. This allows an individual to see their strongest skill areas and choose which ones they wish to emphasize.
- A printed copy of:
  1. Each job and the skill areas used in that job and
  2. Each skill area and all of the descriptions entered can be obtained by just pressing a key.

The SKILL ANALYZER is a complete program which is designed to be used independently but is even more valuable when used in connection with the CREATIVE RESUME GUIDE. The skills identified in the SKILL ANALYZER are stored on disk and may be used by the CREATIVE RESUME GUIDE to produce an unlimited number of resumes which may be focused toward any particular job or skill area.

CREATIVE RESUME GUIDE

Program Options:

- Introduction - Explains the purpose of a resume and how it is used. Provides resume writing guidelines. Discusses three resume formats and gives an example of how to restate job duties as accomplishments.
- Resume categories - Select from nine categories; choose the ones you want to include as well as the order in which information will be presented on the resume.
- Format - Choice of skill oriented, chronological, or combination format.
- Skill areas - Uses skills identified on SKILL ANALYZER. Highlight the most relevant skills for each job. You have the option of restating the previously entered skill descriptions as well as complete control over which skills are included.

JOB HUNTER'S SURVIVAL KIT (contd.)

- Printed resume - May be used as a final copy or as a draft for a professionally printed resume.
- Enter data once, Create unlimited different resumes

The JOBHUNTERS SURVIVAL KIT is a unique, easy to use career guidance program which is available for Apple and TRS 80 microcomputers. It is valuable resource for any school or agency that works with individuals looking for jobs or teaches others how to conduct an effective job search.

A Demonstration disk is available for only $5.00 from Computer Concepts, Inc.

Name of Program KANSAS CAREERS

Make and Model of Computer on Which it is Used Radio Shack TRS-80 Models I & III and Apple II

FOR SALE

yes ☒ no ☐

Order from:

DEVELOPER

Kansas Careers
Bluemont Hall
KSU
Manhattan, KS 66506
(913) 532-6540

CONTACT PERSON

Dennis R. Angle
Kansas Careers
Bluemont Hall
KSU
Manhattan, KS 66506
(913) 532-6540

VOCATIONAL AREA(S)

See pg.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

See pg.

PROGRAM DESCRIPTION

KANSAS CAREERS is a microcomputer-based career exploration system featuring 300 occupations. The 300 occupations represent 95% of the workforce in the State of Kansas. KANSAS CAREERS is a career guidance aid designed to assist in the delivery of career information that can be obtained in four ways:

1. EXPLORE - gives you an opportunity to describe yourself using the 124 different factors in 12 topic areas to find matching Kansas occupations.
2. WHY NOT - lets you find out why an occupation was not listed.

(continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

See pg.

KANSAS CAREERS (cont.)

3. SPECIFIC - is the information aspect of the system and gives you detailed information about occupations, including the mental and physical demands of each occupation in a technical brief.
4. TRAINING IN KANSAS - tells you where in Kansas to train for your desired occupation.

This computerized exploration system provides comprehensive, accurate, and current information for 120 subscribers in Kansas including high schools, junior high schools, colleges, state hospitals, private schools, youth centers, and Vocational Rehabilitation Services.

A set of publications, including the Counselor's Manual, Helpful Academic Subjects, Workbook - Worksheet, and Training in Kansas, complete the KANSAS CAREERS' package.

Assistive Devices, Aids and Modifications is a unique listing of job oriented modifications. Used in conjunction with the Mental and Physical Demands in Specific, a counselor can assess the typical demands of an occupation and then find appropriate aids or devices for the student/client. The information can be accessed by disability and/or specific device categories.

Vocational Areas

Interest Factors
Aptitudes
Temperaments
Education Level
Environmental Conditions
Employment Outlook
Wage/Salary
Hours of Work/Travel
Physical Demands
Physical Activities
Indoor/Outdoor Considerations
Occupational Fields
Training Required

Name of Program MICROCHOICES

Make and Model of Computer on Which it is Used Apple II, Radio Shack TRS-80 Model III, and Commodore 4032 & 8032

FOR SALE

yes ☒ no ☐

Order from:

CSG Corporation
1101 Connecticut Ave., NW
Suite 807
Washington, DC 20036
(202) 466-5663

DEVELOPER

CSG Corporation
1101 Connecticut Ave., NW
Suite 807
Washington, DC 20036
(202) 466-5663

CONTACT PERSON

Bob Alexander
CSG Corp.
1101 Connecticut Ave.NW
Washington, DC 20036
(202) 466-5663

VOCATIONAL AREA(S)

Guidance

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Career Search and Information

PROGRAM DESCRIPTION

MicroCHOICES is used as an integral part of the vocational and career guidance process. The student "Guide" is the user handbook that prepares the student for their interaction with the computer. After completing the "Guide," the student discusses their work with the counselor. Then the student uses the computer to search for appropriate occupations and obtain occupational descriptions. The program uses 89 search criteria.

The program also allows the student to search for colleges and obtain their description.

MODIFICATIONS FOR SPECIAL POPULATIONS

The system contains 30 search criteria that are specific to physically and/or mentally handicapping conditions.

Name of Program MOVIEW, BASIC VIEW AND MICRO VIEW

Make and Model of Computer on Which it is Used Apple II plus; TRS-80, Model III

FOR SALE

yes ☒ **no** ☐
cost recovery
Order from:

Free to public school
educators in Missouri.

DEVELOPER

MicroVIEW
15875 New Halls
Ferry Road
Florissant, MO 63031
(314) 831-7100

CONTACT PERSON

James H. Grogan, Dir.
Missouri VIEW Program
15875 New Halls Ferry
Road
Florissant, MO 63031
(314) 831-7100

VOCATIONAL AREA(S)

n/a

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Career Decisionmaking

PROGRAM DESCRIPTION

Missouri VIEW (Vital Information for Education and Work is a program for Missouri educators funded by the Missouri State Department of Education. MOVIEW utilizes microfilm aperture cards to disseminate occupational information. A microfiche reader or reader-printer is the vehicle that brings the information to the student

Basic VIEW consists of microfilmed career scripts on 200 jobs. Information on job duties, work environment, earning, aptitutdes, interests, related jobs, advantages, advancement and other areas is listed. Handbooks and workshops for MOVIEW and Basic VIEW are available.

Micro VIEW has been developed to serve as a modern career decisionmaking system for the MOVIEW and Basic VIEW programs. The microcomputer is used to search out

(continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

Basic VIEW (3rd Grade Reading Level on Microfiche)
Micro Basic View (3rd Grade Reading Level)

job profiles that are compatible with the clients profile. The program software has been developed for the Apple II Plus microcomputer. The material is suitable for use by secondary, postsecondary, college, social service agencies and community based organizations.

Name of Program OKLAHOMA MICRO-VIEW

Make and Model of Computer on Which it is Used Apple or Radio Shack, 48k

FOR SALE

yes ☒ no ☐

Order from:

Oklahoma View
State Dept. Vo-Tech
1500 W. 7th
Stillwater, OK 747074
(405) 377-2000

DEVELOPER

VIEW Program
Denise Agee
1500 W. 7th
Stillwater, OK 74074
(405) 377-2000

CONTACT PERSON

Denise Agee
VIEW
1500 W. 7th
Stillwater, OK 74074
(405) 377-2000 ext. 390

VOCATIONAL AREA(S)

n/a

FOR WHICH STUDENTS

Regular, Secondary

PROGRAM FORMAT

Career Exploration

PROGRAM DESCRIPTION

Student completes a brief interest survey and inputs answers into computer following specific computer prompts. The program sorts these answers and gives the student/user a list of occupations matching these answers. Student refers to VIEWscripts or microfiche cards for more detailed job information.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program SEARCH AND LEARN

Make and Model of Computer on
Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

DEVELOPER

South Dakota VIEW
P.O. Box 1237
705 N. Dakota
Huron, SD 57350
(605) 773-3447

CONTACT PERSON

South Dakota VIEW
P.O. Box 1237
705 N. Dakota
Huron, SD 57350
(605) 773-3447

VOCATIONAL AREA(S)

n/a

FOR WHICH STUDENTS

Regular
Handicapped
Slow Learner

PROGRAM FORMAT

n/a

PROGRAM DESCRIPTION

Discusses career interests. Students complete interest inventory and the computer gives a printout of occupations. Each occupation is numbered one to nine, number nine being of most interest. (continued on following pages)

MODIFICATIONS FOR SPECIAL POPULATIONS

75

SEARCH AND LEARN (contd.)

```
** BASIS FOR SELECTION              T - "THINGS" CAREERS

1) PERSONAL CHARACTERISTICS         T - TAKING ORDERS
                                    I - INTERACTION
                                    V - VARIETY

2) INTERESTS                        A - APPLIED SKILL
                                    B - BUSINESS
                                    P - PEOPLE

3) SUBJECT INTERESTS                D - SOCIAL SCIENCE
                                    F - DISTRIBUTIVE ED.
                                    J - TRADES/INDUSTRL

4) WORKING CONDITIONS               I - INDOOR

5) PHYSICAL WORK                    L - LIGHT

6) PHYSCIAL ABILITIES               S - SEE (EYESIGHT)
                                    V - COLOR VISION
                                    H - HEARING
                                    T - TALK

7) ABILITIES                        F - FINGER DEXTERITY
                                    E - EYE DETAIL
                                    V - VOCABULARY

8) EDUCATION AND TRAINING           B - FINISH HI-SCHOOL

   EARNINGS                         A - MIN. to $599/MON

--AREAS THAT MATCHED--    --SELECTED CAREERS--

1 2   4 5 6   8 9  (7)    ALTERATION TAILOR
1   3 4 5 6 7   9  (7)    ARTIST (PAINTER)
1   3 4 5     8 9  (6)    BANK TELLER
1 2 3 4 5       9  (6)    BARBER
1 2 3 4 5     8 9  (7)    BARTENDER
    3 4 5 6   8 9  (6)    DISK JOCKEY
1 2 3 4 5 6   8 9  (8)    DISPATCHER-RADIO
1 2 3 4 5       9  (6)    FINGERPRINT CLASSIFIER
1 2   4 5     8 9  (6)    FOOD SERVICE WORKER-HOSPITAL
1 2 3 4       8 9  (6)    INDUSTRIAL-TRUCK OPERATOR
  2 3 4 5 6     9  (6)    INSTRUMENT MAKER
      4 5 6   8 9  (6)    INSURANCE CLERK (MEDICAL)
  2 3 4 5     8 9  (6)    LATHER
1 2 3 4 5     8 9  (7)    LOCOMOTIVE ENGINEER
1 2 3 4 5     8 9  (7)    NEW-CAR GET-READY MECHANIC
1 2 3 4 5     8 9  (7)    OPTICIAN-DISPENSING
1 2   4 5     8 9  (6)    OPTOMETRIC ASSISTANT
1 2 3 4       8 9  (6)    PACKAGER-MACHINE
  2 3 4 5     8 9  (6)    PLATER
1     4 5 6   8 9  (6)    SECRETARY-SCHOOL
1 2 3 4       8 9  (6)    SHEAR OPERATOR
1 2 3 4 5 6   8 9  (8)    TAXI DRIVER
1 2 3 4       8 9  (6)    TOOL-CRIB ATTENDANT
1     4 5 6   8 9  (6)    TRIBAL OFFICE WORKER
  2 3 4 5     8 9  (6)    TRUCK DRIVER (HEAVY)
  2 3 4 5 6     9  (6)    WATCH REPAIRER
```

(26 of 211 CAREERS WERE SELECTED)
(0 CAREERS HAD 9 WATCHES, 2 HAD 8 MATCHES, 6 HAD 7 MATCHES, 18 HAD 6 MATCHES)
YOUR MATCH NUMBER IS THE NUMBER IN PARENTHESES BEFORE THE CAREER LISTING.
LOOK AT ALL OF YOUR OCCUPATIONS THAT HAVE A 9 MATCH FIRST, 8 MATCH SECOND,
7 MATCH THIRD, THEN A 6 MATCH LAST.
DRAW A LINE THROUGH ALL THE CAREERS THAT YOU KNOW THAT YOU DEFINITELY ARE
NOT INTERESTED IN.
FOR CAREERS THAT YOU WOULD LIKE MORE INFORMATION ON, LOOK AT THE VIEW
4-ON-1 BOOK OR MICROFICHE.
SEE YOUR COUNSELOR FOR ASSISTANCE IN INTERPRETATION.

Name of Program SOUTH CAROLINA OCCUPATIONAL INFORMATION SYSTEM

Make and Model of Computer on Which it is Used n/a

FOR SALE

yes ☒ no ☐

Order from:

n/a

DEVELOPER

Employment Security
Commission
1555 Gadsden St.
Columbia, SC 29202
(803) 758-3165

CONTACT PERSON

Carol Kasaski
P.O. Box 995
Columbia, SC 29202
(803) 758-3165

VOCATIONAL AREA(S)

All

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Information

PROGRAM DESCRIPTION

High School Guidance Offices

MODIFICATIONS FOR SPECIAL POPULATIONS

None

73

Name of Program VIRGINIA VIEW

Make and Model of Computer on
Which it is Used Apple II - Plus (and several others)

FOR SALE

yes ☐ no ☐
currently free

Order from:

Virginia View
301 UCOB
Virginia Tech.
Blacksburg, VA 24061

DEVELOPER

Virginia Occupational
Information Coordinating
Committee
P.O. Box 6-Q
Richmond, VA 23216

CONTACT PERSON

Carl McDaniels
Virginia View
301 UCOB
Virginia Tech.
Blacksburg, VA 24061

VOCATIONAL AREA(S)

The computer assisted self assessment provides the use with career ideas to explore.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Interactive - self assessment

PROGRAM DESCRIPTION

This career search helps students to interactively match their interests and capabilities with the profiles of 345 Virginia occupations. Additional information on microfiche are available for more detail after the student has made an occupational selection.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

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COMPUTER LITERACY AND PROGRAMMING

Computer Literacy 73

Computer Literacy 74

Computer Literacy - An Introductory Course 75

Course Master 76

Getting to Know the Apple 79

How to Program in the Basic Language 80

Introduction to Basic 82

Matching (Figures and Alphabet Letters) 84

Micro Computer Keyboarding 83

Motor Training with Printout of Response Time and Accuracy . . . 84

Name of Program COMPUTER LITERACY

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Mr. William Tenney, Dir.
Secondary Education
Akron City Schools
70 N. Broadway
Akron, OH 44308
(216) 434-1661

CONTACT PERSON

Mr. William Tenney, Dir.
Secondary Education
Akron City Schools
70 N. Broadway
Akron, OH 44308
(216) 434-1661

VOCATIONAL AREA(S)

All Vocational Programs

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial
Simulation
Problem Solving

PROGRAM DESCRIPTION

Introduced by short course activities, to become computer literate with computers. Followup application to lab and classroom activities.

MODIFICATIONS FOR SPECIAL POPULATIONS

All students are mainstreamed into the system.

Name of Program COMPUTER LITERACY

Make and Model of Computer on Which it is Used TRS-80 Radio Shack

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Phyllis DeMark
Lorain Co. JVS
RD #1, 1581 Rt. 58
Oberlin, OH 44074
(216) 774-1051

CONTACT PERSON

Phyllis DeMark
Lorain Co. JVS
RD #1, 1581 Rt. 58 South
Oberlin, OH 44074
(216) 774-1051

VOCATIONAL AREA(S)

All Vocational Programs

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial
Simulation
Problem Solving

PROGRAM DESCRIPTION

Introduce by short course activities. To become computer literate with application to lab and classroom situations. Periodic assessment and classroom application.

MODIFICATIONS FOR SPECIAL POPULATIONS

More drill and exercise for repetitious purposes.

82

Name of Program COMPUTER LITERACY -AN INTRODUCTORY COURSE

Make and Model of Computer on
Which it is Used All microcomputers

FOR SALE

yes ☒ no ☐

Order from:

Continental Press
Elizabethtown, PA 17022
(717) 367-1836

DEVELOPER

Penna Dept. of Education
333 Market St.
Harrisburg, PA 17108
(717) 783-6683

CONTACT PERSON

Louis Bocian
Penna Dept. of Education
333 Market St.
Harrisburg, PA 17108
(717) 783-6683

VOCATIONAL AREA(S)

Not specific.
Traditional high school students.

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Literacy

PROGRAM DESCRIPTION

Computer Literacy - An introductory course for classroom teachers and students with no background in computer learning.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COURSE MASTER

Make and Model of Computer on
Which it is Used Apple II - Franklin 1000 - IBM-PC

FOR SALE

yes ☒ no ☐

Order from:

Dr. William Morton
9 Lake Bellevue Dr. #118
Bellevue, WA 98005
(206) 451-0559

DEVELOPER

User Resources
12729 N.E. 20th, #25
Bellevue, WA 98005
(206) 451-0559

CONTACT PERSON

Stan Schafer
12729 N.E. 20th, #25
Bellevue, WA 98005
(206) 451-0559

VOCATIONAL AREA(S)

Any

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial
Simulation
Problem Solving
Interactive

PROGRAM DESCRIPTION

Course Master is a new-easy system for the teacher to develop their own courseware for computers or interactive video without having to learn computer programming. Course Master interprets English language commands. Unlike other authoring systems CM is extremely flexible - thus the teacher can develop flexible, branching courses to fit a wide range of students and subject matter. (continued on following pages)

MODIFICATIONS FOR SPECIAL POPULATIONS

Whatever the teacher conceives as necessary for the student.

CourseMaster Features

1) You do not have to be a computer programmer to develop and compose courses with CourseMaster. You do need to learn from a minimum of six to a maximum of 16 English language instructions. These English language instructions actually do the "programming" for you. You begin on the "Entry level" designing and composing interactive text courses using six primary instructions. Next, the "Advanced level" has an additional 7 instructions, including things like putting color on the screen, composing fill-in answers for participants to use, specialized reviewing, pause and wait instructions. Finally, you can learn how to compose interactive video courses, actually controlling the video information used.

2) CourseMaster uses a screen editor so that you can literally write, or compose, your course. The screen editor is one designed specifically for CourseMaster. USER provides an easy, step-by-step process to show you how to use the editor functions.

3) Using CourseMaster you can create approximately 60 video screens on a single sided 5-1/4" floppy disk. (40 or 80 columns x 25 line video screen size) On a double sided disk you can get about 120 video screens. We recommend the dual sided disk systems in order to eliminate disk handling for many courses. This is helpful because the recommended length for many courses is a maximum of 100 video screens.

4) Learning Techniques (Interactive Modes) available:

   a) Teach/test...test/teach: This is perhaps the most well known of the standard learning techniques. Teach something, then test for knowledge. A related, and sometimes very useful technique is to test a participant/student's body of knowledge, and then teach them what they don't know.

   b) Simulation: A learning technique for the adventurous, in that you can start with a fact/knowledge base, then ask the participant to choose the answer to a question in the form of a situation, or "what would you do if..." pattern. The participant chooses the answer, and then sees the result of that choice occur. Best used with interactive video. Also an excellent way of reviewing material someone is already supposed to know.

   c) Diagnostic: With this technique you set up a fact/knowledge base and then say something like "if you want the following result check this... and so on..." What happens is that based on a known end result, the participant tests their way through many levels of possible right and wrong choices. Particularly useful when teaching specific skills, or skilled use of machinery or electronics.

   d) Menu: Similar to the Diagnostic, except that you give choices early, and let the participant pick their way through the material. They then pick at their own interest/knowledge level.

e) Command: If you were teaching someone how to run a piece of machinery, or go through a specific routine outside the microcomputer environment, this would be one technique that could be very useful. You tell them to go do...whatever...come back and compare their results with the material presented through CourseMaster.

One can use several learning techniques in any given course, though some are more complex than others.

5) In order to allow the participant to test progress, the system allows the course designer to build true/false questions, multiple choice questions, and fill-in questions (with up to 256 characters for answer). Additionally, using the IBM PC, we can print out any single video screen that appears. This is useful for take home notes, summary pages, high-light pages, etc. (These features available on the IBM PC--other hardware systems may not have this feature.) Single student scoring available as well, showing number of answers correct, which ones needed review, and how many times reviewed if more than one review. The course developer chooses those questions to be counted in the student scoring.

6) One of the key elements in interactive courses, is the ability to tie together the various "pieces" of course information. The flexible course design processes of CourseMaster allow you to branch anywhere on the same course disk. In many systems the screen and branching options are pre-formatted--you are restricted to very specific line by line entries. In CourseMaster, you can branch from any screen to any other screen on the same disk. While there are some rules to follow, it is a very flexible system.

7) CourseMaster takes advantage of the hardware environment and allows multiple color displays (with the IBM PC) on each video screen (on a composite color monitor, or RGB monitor for text only--no color on a monochrome monitor). The screen can have one background color, another colored border, and still another for text. The rapid display changes available help to make the presentation smooth. For systems having no color capability, the inverse video and screen blink features are still applicable.

8) CourseMaster can be used on a number of microcomputers and with a number of microcomputer operating systems, including IBM PC (DOS), Apple II+ (Applesoft), Altos/Zenith (CP/M 2.2). Additionally, IBM PC and Apple II+ look-alikes can be used with CourseMaster as well, though some minor adjustments may be necessary. CourseMaster will be available for a number of systems that use CP/M.

9) The following are the hardware specifications for the system: IBM PC, 128K RAM, Dual Disks (320KB) Dual Sided, Color Graphic card, Parallel Printer (MX80) type, RGB or Monochrome Monitor for interactive text courses, RS170 Composite Monitor for interactive text and video, VTC (Video Tape Controller) for interactive text and video, and a VTR either the Panasonic NV-8200, or Sony SLO-323 Video Tape Recorder. (For Apple systems the specifications are the same, except the microcomputer itself.)

Name of Program GETTING TO KNOW THE APPLE

Make and Model of Computer on Which it is Used Apple II Plus - DOS 3.3

FOR SALE

yes ☒ no ☐

Order from:

North Carolina Rural
Renaissance Consortium
P.O. Box 35009
Charlotte, NC 29235
(704) 373-6424

DEVELOPER

Kathy Munday
c/o Edgecombe Technical
College
Tarboro, NC 27866
(919) 823-5166

CONTACT PERSON

Dr. Norman H. Petty
North Carolina Rural
Renaissance Consortium
Central Piedmont
Community College
P.O. Box 35009
Charlotte, NC 28204
(704) 373-6424

VOCATIONAL AREA(S)

All areas/computer literacy

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Computer Literacy

PROGRAM DESCRIPTION

Provides an introduction to the Apple keyboard and basic programming techniques. Working time is approximately 4 hours. (5¼" floppy disk/notebook: Apple II compatible)

MODIFICATIONS FOR SPECIAL POPULATIONS

This excellent program was originally used in a computer summer camp for kids sponsored by Edgecombe Technical College. It was modified to be used by adults in a NCRRC sponsored microcomputer workshop. Can still be used for a variety of target populations.

Name of Program HOW TO PROGRAM IN THE BASIC LANGUAGE

Make and Model of Computer on Which it is Used Apple II, TRS-80 Mod I & II, PET, TI, Atari

FOR SALE

yes ☒ no ☐

Order from:

Sterling Swift Pub.
1600 Fortview Rd.
Austin, TX 78704
(512) 444-7570

DEVELOPER

Sterling Swift
1600 Fortview Rd.
Austin, TX 78704
(512) 444-7570

CONTACT PERSON

Sterling Swift
1600 Fortview Rd.
Austin, TX 78704
(512) 444-7570

VOCATIONAL AREA(S)

Office Training
Programming

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

HOW TO PROGRAM IN THE BASIC LANGUAGE

1) Title: How to Program in the BASIC Language
2) Publisher: Sterling Swift Publishing Co., 1600 Fortview Rd., Austin, TX 78704
3) Author: James L. Poirot and Don Retzlaff. Authors of the TI-99/4A edition are Merridee L Heidt and Poirot.
4) Grade Level: 6-14 and teachers
5) Number of Programs: 14
6) Hardware: Diskette or Cassette (except for Texas Instruments, disk only, 16k). Disks available for the Apple II DOS 3.2 and 3.3, TRS-80 Model I and Model III, PET 2000 and 4000 series and the Commodore 64, Texas Instruments 99/4 and 99/4A. Disks require 32K (except for Texas Instruments). Cassettes available in 16K. (continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

7) Price: $74.95 for one set of disks or cassettes and a student workbook.
   $69.00 for a set of disks or cassettes - subsequent sets to the same account $34.50.
   $5.95 student workbook
   $5.95 teacher's workbook (Apple, TRS-80) free upon adoption of 10 or more student workbooks.
8) Description: Software on disks or cassettes parallels chapters in the student workbook. The workbook acts as reinforcement for learning. Programming background is not required. This software and workbook combination gives the student step-by-step learning of BASIC programming.
9) Instructional Strategies: The instructional strategy in this program is tutorial.
10) Student/Teacher Instructional Documentation: The available student/teacher instructional documentation for the use of this program includes activity/worksheets, program operating instructions, teacher's guide and student workbook.
11) Strengths: The strengths of this program are: No previous computer knowledge is required; clear and simple presentation of topics; accompanying student workbook reinforces learning; tutorial nature or the programs makes learning fun.
12) Other: Networking capability for Apple, Radio Shack, PET - price $495.00.

Name of Program INTRODUCTION TO BASIC

Make and Model of Computer on Which it is Used Apple, TRS-80, others

FOR SALE

yes ☒ no ☐
Available 1983
Order from:

The Conover Company
P.O. Box 155
Omro, WI 54963
(414) 685-5707

DEVELOPER

The Conover Co.
P.O. Box 155
Omro, WI 54963
(414) 685-5707

CONTACT PERSON

Terry Schmitz
The Conover Co.
P.O. Box 155
Omro, WI 54963
(414) 685-5707

VOCATIONAL AREA(S)

Computer programming

FOR WHICH STUDENTS

- Regular
- Handicapped
- Disadvantaged
- Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

Using the LaBelle format, the student is introduced to the BASIC language. With each new command, the student is allowed to practice writing small programs on the computer before continuing with the instruction on the audio-visual format.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MICRO COMPUTER KEYBOARDING

Make and Model of Computer on Which it is Used Apple II +, TRS-80

FOR SALE

yes ☒ no ☐

Order from:

DEVELOPER

Southwestern Pub. Co.
5101 Madison Rd.
Cincinnati, OH 45227
(513) 271-8811

CONTACT PERSON

Southwestern Representative
Southwestern Pub. Co.
5101 Madison Rd.
Cincinnati, OH 45227

VOCATIONAL AREA(S)

All vocational areas

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The program teaches the proper use of the keyboard, using graphics for illustration, then provides reinforcement through drill and practice. The drill and practice is enhanced with reports on speed and accuracy of the user.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program 1. MOTOR TRAINING WITH PRINTOUT OF RESPONSE TIME AND ACCURACY
2. MATCHING (FIGURES AND ALPHABET LETTERS)

Make and Model of Computer on
Which it is Used Apple II Plus

FOR SALE

yes ☒ no ☐

Order from:

Zoro Computer Services
(206) 542-3492

DEVELOPER

Kirk Reiten
Zoro Computer Services
(206) 542-3492

CONTACT PERSON

A. Ryder
Meany School
201 21st E.
Seattle, WA 98112
(206) 324-8497

VOCATIONAL AREA(S)

Computer Awareness Training
Hand/Eye Coord.
Pre-Reading

FOR WHICH STUDENTS

Handicapped (Physical and Mod. & Severe M.R.)

PROGRAM FORMAT

1. Training to use computer
2. Drill and Practice (matching)

PROGRAM DESCRIPTION

After pre-training with toys/switches/drawing device. Program(s) are introduced 1. Takes data on pupil response time and accuracy; 2. Allows matching of figures, upper and lower case alphabet letters utilizing a variety of interfaces.

MODIFICATIONS FOR SPECIAL POPULATIONS

Multiple adaptions via box with jacks for switches that replaces the game paddles.

HEALTH

Developmental Stages 87

Microcomputer Applications in Vocational Education: Health Occupations 88

Nursing Math Calculations and Conversions 89

STRESS - 5 Part 90

Name of Program DEVELOPMENTAL STAGES

Make and Model of Computer on Which it is Used Apple II Plus 48K

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Jan Irving and
Werner Brandt
Chemeketa Community
College
P.O. Box 14007
Salem, OR 97309
(503) 399-5256

CONTACT PERSON

Jan Irving and
Werner Brandt
Chemeketa Community
College
P.O. Box 14007
Salem, OR 97309
(503) 399-5256

VOCATIONAL AREA(S)

Nursing

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

It's an alternative learning strategy. A student guide has been developed along with the documentation. Each concept is applied in the clinical setting.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MICROCOMPUTER APPLICATIONS IN VOCATIONAL EDUCATION: HEALTH OCCUPATIONS

Make and Model of Computer on Which it is Used No. 217A TRS-80 Model III TRS DOS 48K - $11.75; No. 217B Apple II Plus 3.3 DOS 48K - $8.25; No. 217C Pet (Not Available); No. 217D Additional Printed Documentation Only - $1.25

FOR SALE

yes ☒ no ☐

Order from:

Curriculum Publications Clearinghouse
Western Illinois Univ.
Horrabin Hall 46
Macomb, IL 61455

DEVELOPER

Wilma Jean Alexander
Illinois State Univ.
Normal, IL 61761

CONTACT PERSON

James Haire
ISBE/DAVTE
100 N. First St.
Springfield, IL 62777
(217) 782-4620

VOCATIONAL AREA(S)

Health Occupations

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

A series of programs designed to demonstrate the use of the microcomputer in the health occupational area. Each set includes all of the programs listed below on one or more 5¼" disks plus one printed documentation. The specific programs are the following:

- Chemical Poison Index
- Clinitest Results Program
- Drug Interaction
- Geuer-gesner Analysis
- Heart I
- Life Expectancy
- Rating Your Fitness
- Lung
- Sports/Exercise Evaluation
- Medical Record Program
- Hospital Records

MODIFICATIONS FOR SPECIAL POPULATIONS

None

95

Name of Program NURSING MATH CALCULATIONS AND CONVERSIONS

Make and Model of Computer on Which it is Used Apple II Plus 48K

FOR SALE

yes ☐ no ☒

Order from:

Developed from a State grant - on loan to Oregon schools only.

DEVELOPER

Jan Irving and
Werner Brandt
Chemeketa Community
College
P.O. Box 14007
Salem, OR 97309
(503) 399-5256

CONTACT PERSON

Jan Irving and
Werner Brandt
Chemeketa Community
College
P.O. Box 14007
Salem, OR 97309
(503) 399-5256

VOCATIONAL AREA(S)

Nursing

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

It's an alternative learning strategy. A student guide has been developed along with the documentation. Each concept is applied in the clinical setting.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

96

Name of Program STRESS - 5 PART

Make and Model of Computer on
Which it is Used Apple II Plus 48K

FOR SALE

yes ☐ no ☒

Order from:

Developed from a State grant.

DEVELOPER

LaVerne Elliott and
Werner Brandt
Chemeketa Community
College
P.O. Box 14007
Salem, OR 97309
(503) 399-5256

CONTACT PERSON

LaVerne Elliott and
Werner Brandt
Chemeketa Community
College
P.O. Box 14007
Salem, OR 97309
(503) 399-5256

VOCATIONAL AREA(S)

Nursing

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

It's an alternative learning strategy, Lecture content was replaced by CAI experience for the Re-Entry nurses. Otherwise, it is available for students that want an extra experience.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

HOME ECONOMICS

A Computer Assisted Instructional Unit on Kitchen Space and Dimensions 93

Consumer Education - Secondary 97

Eating Smart 98

How Big? How Heavy? How Long? Converting English Weights and Measures 99

Kitchen Measurement Game 100

MECC Elementary Vol. 13 - Nutrition 101

Microcomputer Applications in Vocational Education: Home Economics 102

Problem Solving 103

Sewing Machine Trouble Shooter 104

Sneaky Snacker 105

Name of Program A COMPUTER ASSISTED INSTRUCTIONAL UNIT ON KITCHEN SPACE AND DIMENSIONS

Make and Model of Computer on Which it is Used DEC 20

FOR SALE

yes ☒ no ☐
$5.75

Order from:

Mr. Ken Struthers,
Texas Woman's Univ.
Bookstore
P.O. Box 22969
Denton, TX 76204

DEVELOPER

June Impson, Ed.D.
Home Economics Education
& Consumer Sciences
TX Woman's University
P.O. Box 23975
Denton, TX 76204
(817) 387-6915

CONTACT PERSON

June Impson, Ed. D.
Home Economics Education
& Consumer Sciences
TX Woman's University
P.O. Box 23975
Denton, TX 76204
(817) 387-6915

VOCATIONAL AREA(S)

Home Economics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

The purpose of this computer assisted instructional unit is to facilitate individualization of instruction for housing students who represent a wide range of entry level skills. One unit of the course "Kitchen Space and Dimensions" (KSD) has been computerized and administered on an experimental basis. The computer assisted instruction (CAI) unit is almost entirely student controlled. The only tasks performed by the teacher are administering a paper-pencil (computer scored) pre test, giving students the CAI-KSD Manual, and administering the post test. (continued on following pages)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

A COMPUTER ASSISTED INSTRUCTIONAL UNIT ON KITCHEN SPACE AND DIMENSIONS (contd.)

The program consists of: 1) an item pool stored in the computer, 2) a program for student computer use to self-test and obtain immediate feedback on answers to items organized by topic, learning level, and numerical sequence, and 3) the CAI-KSD Manual. The manual contains: an overview of how to learn by CAI, an outline of KSD Unit, reference list, step by step instructions on how to use a computer terminal, how to complete requirements for the unit, student/teacher contract, student progress chart, and "help" coupons.

A field test of materials and procedures was conducted with 20 undergraduate consumer housing students. Revisions were made on Instrucational material and test items. The program is evaluated each semester with a student evaluation instrument consisting of 86 items for 13 evaluation variables.

The Computer Program

The computer program is based on the existing "Quest" program. The Quest system allows the entry of multiple choice questions into a data base or computer file. This file is then accessible to students by using the information in their manual. They can review the test questions and test their knowledge. The program enables students to self-test, learn their percent of correct answers, and learn the correct answers. The amount of time each student spends on line is automatically recorded.

The Computer Assisted Kitchen Space and Dimensions Unit

The CAI-KSD Unit consists of an Instructional unit on the topic, kitchen space and dimensions, an 86 item test pool, a computer program using Quest, and a 13 variable-item student evaluation instrument.

The unit contains purposes, objectives, concepts, facts, terms, references, and test items. The information for the unit was developed from the following resources:

- Texas State Educational Competencies and the Conceptual Framework for Homemaking Education in Texas
- Texas Education Agency adopted textbooks for secondary vocational homemaking courses
- College level housing textbooks containing information pertaining to space and dimensions in kitchens.

KSD Unit Topics

1. Laws and regulations
2. Building codes and requirements thereof
3. Zoning laws
4. Floor plans
    a. measurements necessary
    b. the drawing and its features
    c. types of plans
    d. advantages/disadvantages of each floor plan
    e. required passage space

5. Work triangle
   - a. purposes
   - b. the work center
   - c. advantages/disadvantages of floor plans in relation to zoning and traffic areas
   - d. dimensions of the work triangle
6. Location of the kitchen in the home
   - a. effect on traffic areas
   - b. in relation to other activities
7. Counters
   - a. dimensions
   - b. requirements in relation to FHA standards
   - c. location for use
8. Eating areas
   - a. location in the home
   - b. relation to floor plans
   - c. HUD standards
9. Shelving and cabinets
   - a. dimensions
   - b. FHA standards
   - c. requirements in relation to kitchen floor plans
10. Storage areas
11. Kitchen modifications for the handicapped
   - a. height modifications
   - b. space modifications
12. Space
   - a. for movement and travel
   - b. for working
   - c. for cabinets

Computer Assisted Instruction-Kitchen Space and Dimensions - Student Manual

The student manual describes both the unit and the computer program and provides information which enables students to complete the unit independently except for taking the pre/post test in the classroom.

Part I of the Manual contains a description of the topic content. It includes:

1) An introduction to the Kitchen Space and Dimensions unit including a description of the unit content.
2) Directions for student use of the manual.
3) Identification and explanation of the purposes and objectives of this housing unit.
4) A list of concepts, facts, and terms related to this housing unit which the student can identify and study in the reference material available.

5) A complete list of reference materials for student's use in obtaining information related to the concepts, facts, and terms of KSD. These reference materials were held on reserve in the school library for student's use in enhancing their learning of the information in this unit.

6) Guidelines for successful completion of the computerized learning program including: a description of specific criteria the student must complete to receive credit for the unit.

7) Additional information in Part I consists of a student/ teacher contract form, a Record of Progress sheet, and directions for taking the KSD Pre and Post tests.

Part II of the Manual contains instructions on how to use the computer program. It includes:

1) A description of the computerized learning program including an introduction to computer-assisted learning.

2) A statement of the purpose of the program including how the computer can be of benefit to the student in the individualized learning process.

3) A "How to Use" self-instructional section for the student.

Name of Program CONSUMER EDUCATION - SECONDARY

Make and Model of Computer on Which it is Used Radio Shack - TRS-80 Model III microcomputer

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Region XX
Education Service Center
1314 Hine Ave.
San Antonio, TX 78208
(512) 271-7611

CONTACT PERSON

Jean Barton
201 E. 11th St.
Austin, TX 78701
(512) 834-4296

VOCATIONAL AREA(S)

Vocational Home Economics

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The presentation is straight forward (true/false and multiple choice test formats). Graphics are not used extensively.

MODIFICATIONS FOR SPECIAL POPULATIONS

None at this time.

Name of Program EATING SMART

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

Pillsbury Co.
Eat Smart Computer
Program
Minneapolis, MN 55402

DEVELOPER

Pillsbury Co.
Eat Smart Computer
Program
Minneapolis, MN 55402

CONTACT PERSON

Pillsbury Co.
Eat Smart Computer
Program
Minneapolis, MN 55402

VOCATIONAL AREA(S)

Home Economics

FOR WHICH STUDENTS

Regular
Slow Learner

PROGRAM FORMAT

Analysis of personal diets

PROGRAM DESCRIPTION

As a tool for analysis. Used for analyzing individual's diets according to the RDA. Computer makes suggestions to help improve diet. Follow up is a self analysis - comparing one day's suggestions to the next days.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

104

Name of Program HOW BIG? HOW HEAVY? HOW LONG?
CONVERTING ENGLISH WEIGHTS AND MEASURES

Make and Model of Computer on Which it is Used Apple II, II+, IIe

FOR SALE

yes ☒ no ☐

Order from:

Sunburst Communications
39 Washington Ave.
Rm. 6363
Pleasantville, NY 10570
(800) 431-1934

DEVELOPER

Sunburst Communications
39 Washington Ave.
Rm. 6363
Pleasantville, NY 10570
(800) 431-1934

CONTACT PERSON

Jim Jensen
Portage High School
2505 New Pinery Rd.
Portage. WI 53901
(608) 742-2165

VOCATIONAL AREA(S)

Home Economics
Woods
Vocational Math

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

This diskette contains nine programs which focus on the English measurement system. The first five programs, Conversion Lesson, Liquids, Length, Time and Weights, focus on conversions between units of measurement, such as quarts to gallons. Two programs, Addition Lesson and Addition Drill, cover the addition of mixed units of measurement. The final programs, Subtraction Lesson and Subtraction Drill deal with the subtraction of mixed units of measurements. Each of the sections contains one tutorial program to teach the operation and one or more drill and practice programs to develop skill in using the operation. Graphics and animation are used to make the concepts more concrete. The student chooses the number of problems to be presented (1-30). A score is given at the end of each program.

MODIFICATIONS FOR SPECIAL POPULATIONS

EEN students can be assigned programs which will provide instruction and as many repetitions as needed to accomplish mastery of the concept. The programs are all designed to be used either for practice or as a mastery quiz. They are highly motivating.

Name of Program KITCHEN MEASUREMENT GAME

Make and Model of Computer on Which it is Used Apple II+

FOR SALE

yes ☒ no ☐

Order from:

Inservice Home Economics
Teacher Education Project

DEVELOPER

Inservice Home Ec.
Teacher Education Project
Home Ec. 107
Univ. of Arizona
Tucson, AZ 85721
(602) 621-1834

CONTACT PERSON

Karla Kluver
Home Ec. 107
Univ. of Arizona
Tucson, AZ 85721
(602) 621-1834

VOCATIONAL AREA(S)

Home Economics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

Kitchen Measurement Game is introduced by describing the need to measure accurately. To use the game, one chooses which food stuff they want to answer. The contestant then determines which kitchen measurement tools are used. The game can be played with two players or two teams.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MECC ELEMENTARY VOL. 13 - NUTRITION

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

MECC Instructional Serv.
2520 Broadway Dr.
St. Paul, MN 55113
(612) 376-1122

DEVELOPER

Minnesota Dept. of Ed.

CONTACT PERSON

Minnesota Educational Computing Consortium
Mgr. Instructional System Development
2520 Broadway Dr.
St. Paul, MN 55113
(612) 376-1122

VOCATIONAL AREA(S)

Home Economics
Nutrition

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

Program says for 5th to 6th grade level - but is much more advanced even for 9th & 10th grade

PROGRAM FORMAT

Tutorial
Simulation
Problem Solving

PROGRAM DESCRIPTION

The first program, Calorie Bank, provides a colorful, animated introduction to the concept of trying to get the most nutrients possible for the calories one consumes. The other two programs, Nutrients and Calories, analyze data on the foods eaten and activities performed by the students. They present the students with measures of their nutrient levels and caloric balance. There are activity worksheets and student handouts.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MICROCOMPUTER APPLICATIONS IN VOCATIONAL EDUCATION: HOME ECONOMICS

Make and Model of Computer on Which it is Used No. 218A TRS-80 Model III TRS DOS 48K - $8.25; No. 218B Apple II Plus 3.3 DOS 48K - $8.25; No. 218C Pet Basic 3 Commodore 4040 Disk Drive - $4.75; No. 218D Additional Printed Documentation Only - $1.25

FOR SALE

yes ☒ no ☐

Order from:

Curriculum Publications
Clearinghouse
Western Illinois Univ.
Horrabin Hall 46
Macomb, IL 61455

DEVELOPER

Wilma Jean Alexander
Illinois State Univ.
Normal, IL 61761

CONTACT PERSON

James Haire
ISBE/DAVTE
100 N. First St.
Springfield, IL 62777
(217) 782-4620

VOCATIONAL AREA(S)

Home Economics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

A series of programs designed to demonstrate the use of the microcomputer in the home economics occupational area. Each set includes all of the programs listed below on one or more 5¼" disks plus one printed documentation. The specific programs are the following:

Interior Decorating Estimating
Pounds Away Program
Decision Analysis
Fiber Care Program
Clothing Figure Analysis
Stain Removal
Consumer Math I
Consumer Math II
Housing Options
Home Loan Analysis
Personal Budget
Utilities
Nutrition Analysis
Home Owner's Capital Gain
Measurement Conversion
Recipe Analysis

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program PROBLEM SOLVING

Make and Model of Computer on Which it is Used Apple II+

FOR SALE

yes ☒ no ☐

Order from:

Inservice Home Economics
Teacher Education Project

DEVELOPER

Inservice Home Ec.
Teacher Education Project
Home Ec. 107
Univ. of Arizona
Tucson, AZ 85721
(602) 621-1834

CONTACT PERSON

Karla Kluver
Home Ec. 107
Univ. of Arizona
Tucson, AZ 85721
(602) 621-1834

VOCATIONAL AREA(S)

Home Economics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Problem Solving teaches the user the six steps in Practical Problem Solving. The program describes a conflict between an employee and her employer. The user then works through the steps of problem solving based on the scenerio. This program has several follow up questions at the end of the program. This program would be good in any classroom where one is teaching a unit on problem solving. It would also be appropriate in any occupational classroom to teach job skills.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

109

Name of Program SEWING MACHINE TROUBLE SHOOTER

Make and Model of Computer on Which it is Used Apple IIe

FOR SALE

yes ☒ no ☐

Order from:

Inservice Home Economics
Teacher Education Project

DEVELOPER

Inservice Home Ec.
Teacher Education Project
Home Ec. 107
Univ. of Arizona
Tucson, AZ 85721
(602) 621-1834

CONTACT PERSON

Karla Kluver
Home Ec. 107
Univ. of Arizona
Tucson, AZ 85721
(602) 621-1834

VOCATIONAL AREA(S)

Home Economics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Simulation

PROGRAM DESCRIPTION

Sewing Machine Trouble Shooter has four parts within the programs. Three graphic options are available. One shows how to thread a sewing machine; another demonstrates how to thread the bobbin; and the last show correct and incorrect thread tensions. The fourth option of Sewing Machine Trouble Shooter lists sewing machine problems, causes, and solutions. The advantage of this program is that the clothing construction teacher can help students with construction problems while students learn to correct problems on their sewing machines. This program could also be used as a testing device to determine if competent to use the sewing machine.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program SNEAKY SNACKER

Make and Model of Computer on Which it is Used TRS 80 III

FOR SALE

yes ☒ no ☐

Order from:

We will give copy on your disk with the stipulation you send us one of yours.

DEVELOPER

East Texas State
Home Economics
Rt. 1
Commerce, TX 75428
(214) 886-5451

CONTACT PERSON

Mildred Luckhardt
ETSU
Home Economics
Rt. 1
Commerce, TX 75428
(214) 886-5451

VOCATIONAL AREA(S)

Nutrition

FOR WHICH STUDENTS

Regular

All could use

PROGRAM FORMAT

Could be Drill and Practice
Problem Solving

PROGRAM DESCRIPTION

This program is used to help students calculate the nutrients they receive when they eat snack foods. The 30 foods include such items as pizza, coke, twinkies, different candy bars, etc. The nutrients listed are those that teens are most often lacking. The program would work as a drill and practice if it were used repeatedly. On the other hand it could be used to analyze a student's food practices and conclude to change eating patterns. Instruction by the instructor would be different for different purposes.

MODIFICATIONS FOR SPECIAL POPULATIONS

Special students might need greater teacher help in understanding the summary of nutrients.

INDUSTRIAL ARTS

Industrial Arts Program 109

Study Quiz Files and Multiple Choice Files 110

Name of Program INDUSTRIAL ARTS PROGRAM

Make and Model of Computer on Which it is Used Apple II+ and IIe

FOR SALE

yes ☒ no ☐

Order from:

Minnesota Curriculum
Services Center
3554 White Bear Ave.
White Bear Lake, MN 53110
(612) 770-3943

DEVELOPER

n/a

CONTACT PERSON

Christine Krueger
Franklin High School
8222 S. 51st St.
Franklin, WI 53132
(414) 421-3000

VOCATIONAL AREA(S)

Industrial Arts

FOR WHICH STUDENTS

- Regular
- Handicapped
- Disadvantaged
- Slow Learner

PROGRAM FORMAT

- Drill and Practice
- Tutorial

PROGRAM DESCRIPTION

The disk contains construction and energy formulas. The most useful program is the one on micrometer reading. It simulates a micrometer, so it is useful for drill, practice and tutorial.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

113

Name of Program STUDY QUIZ FILES AND MULTIPLE CHOICE FILES

Make and Model of Computer on Which it is Used Apple II Plus 48K

FOR SALE

yes ☒ no ☐

Order from:

Gamco Industries, Inc.
Box 310
Big Spring, TX 79720-0120

DEVELOPER

Compu-tations Inc.
P.O. Box 502
Troy, MI 48099

CONTACT PERSON

Gamco Industries, Inc.
Box 310
Big Spring, TX 79720-0120

VOCATIONAL AREA(S)

Industrial Arts
Home Economics
Agriculture

FOR WHICH STUDENTS

Regular
Handicapped
Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

Series of two resource programs which allow a teacher without programming knowledge to create, save, retrieve, revise, or run quizzes on any subject. Each program accepts up to 30 questions which are then scrambled and re-presented until material is mastered. Both programs include hard copy print. capabilities. A sample of the questions on the use of the Radial Arm - Circular Saw can be found on the following page.

MODIFICATIONS FOR SPECIAL POPULATIONS

These programs are used to enter voc. ed. course information to prepare our students for upcoming tests. It provides the needed repetition and review that our EEN students need prior to testing.

Radial Arm-Circular - Sample Questions

1. When crosscutting on a radial arm saw
   a. Raised to clear the surface of the stock
   b. Used the same as when ripping
   c. Removed
   d. Set to drag on the face of the stock
   e. Tightened in the up position

2. One of the following parts of the radial-arm saw cannot be moved to make adjustments
   a. Anti-kickback device
   b. Yoke
   c. Radial arm
   d. Saw table
   e. Motor

3. The blade on the circular saw should be adjusted to
   a. 1/32" above the stock
   b. 1/15" above the stock
   c. 1/4" above the stock
   d. 3/8" above the stock
   e. 1/8" above the stock

4. A compound bevel and miter cut is called a
   a. Stepped tapper
   b. Hopper cut
   c. Cheek cut
   d. Radial cut
   e. Shoulder cut

5. An accessory that cuts all widths of grooves from 1/8 inch to 13/16 inch is called
   a. Grooving head
   b. Cutter head
   c. Molding head
   d. Dado head
   e. Combination blade

8. The size of a radial arm or circular saw if determined by the
   a) Horsepower rating
   b) Width and length of the table
   c) Diameter of the blade
   d) Both A and B above
   e) Both A and C above

MATHEMATICS

Compu-Math Arithmetic Skills 115

Counting Bee 116

Edu-Ware Decimals 117

Edu-Ware Fractions 118

Essential Mathematics III 119

Factoring Whole Numbers (3 diskettes), Fractions (6)
Decimals (4) 120

Lessons in Algebra 121

Milliken Math 122

Perception 3.0 123

Read and Solve Math Problems 124

SRA Computer Drill and Instruction Mathematics Level C 125

Name of Program COMPU-MATH ARITHMETIC SKILLS

Make and Model of Computer on Which it is Used Apple II or II Plus

FOR SALE

yes ☒ no ☐
$49.95

Order from:

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Tayler
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Mathematics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

ARITHMETIC SKILLS helps children establish a strong foundation of basic mathematic skills. ARITHMETIC SKILLS covers counting, addition, subtraction, multiplication, and division.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COUNTING BEE

Make and Model of Computer on
Which it is Used Apple II or II Plus

FOR SALE

yes ☒ no ☐
$29.95
Order from:

Edu-Ware Services
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Mathematics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

In COUNTING BEE, eight Learning Units explore addition, block counting, subtraction, shape discrimination, comparing weights, water height, moving circles, and length comparison.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program EDU-WARE DECIMALS

Make and Model of Computer on Which it is Used Apple II or II Plus, Atari BASIC

FOR SALE

yes ☒ no ☐

Order from:

Edu-Ware Services, Inc.

$49.00 Apple Disk
$39.95 Atari Disk
$29.95 Atari Cassette

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Mathematics

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Seven Learning Units in EDU-WARE DECIMALS cover conversion, addition of decimals, subtraction of decimals, rounding off decimal numbers, multiplication of decimals, division of decimals, and percentage.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program EDU-WARE FRACTIONS

Make and Model of Computer on
Which it is Used Apple II or II Plus, Atari BASIC

FOR SALE

yes ☒ no ☐

Order from:

Edu-Ware Services, Inc.

$49.00 Apple Disk
$39.95 Atari Disk
$29.95 Atari Cassette

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Mathematics

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

EDU-WARE FRACTIONS contains six Learning Units: definition and parts of the fraction, denominators, addition of fractions, subtraction of fractions, multiplication of fractions, and division of fractions.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

120

Name of Program ESSENTIAL MATHEMATICS III

Make and Model of Computer on Which it is Used TRS-80 Model III - double disk drive

FOR SALE

yes ☒ no ☐

Order from:

Bertamax, Inc.
101 Nickerson St.
Suite 550
Seattle, WA 98109
(206) 282-6249

DEVELOPER

Bertamax, Inc.
101 Nickerson St.
Suite 550
Seattle, WA 98109
(206) 282-6249

CONTACT PERSON

Bertamax, Inc.
101 Nickerson St.
Suite 550
Seattle, WA 98109
(206) 282-6249

VOCATIONAL AREA(S)

Child Care
Distributive Education
Building Management

FOR WHICH STUDENTS

Disadvantaged

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

Student is placed at approximate level or determined by vocational teacher. Student works at own pace. Vocational teacher or instructional assistant monitors progress. Program is very successful.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program FACTORING WHOLE NUMBERS (3 diskettes), FRACTIONS (6) DECIMALS (4)

Make and Model of Computer on Which it is Used TRS-80 MOD I, TRS-80 MOD III, Apple 3.3, PET 16K

FOR SALE

yes ☒ no ☐

Order from:

Quality Educational
Designs
P.O. Box 12486
Portland, OR 97212
(503) 287-8137

DEVELOPER

Quality Ed. Designs
P.O. Box 12486
Portland, OR 97212
(503) 287-8137

CONTACT PERSON

J. Benton
P.O. Box 12486
Portland, OR 97212
(503) 287-8137

VOCATIONAL AREA(S)

Mathematics

FOR WHICH STUDENTS

Regular
Handicapped
Poor Readers

PROGRAM FORMAT

Drill and Practice
Tutorial
Problem Solving

PROGRAM DESCRIPTION

Programs are sequenced. Each topic provides tutorial, problem-solving, game or enrichment activities. Some of the tutorial programs available are: Factor Pairs, Pairs and Squares, Primes and Composites, Exponents and Least Common Multiple. Game/Exploration Programs are: the Rectangle Game, Guess and Test, How Many Factors, the Euclid Game and Factoring Game.

MODIFICATIONS FOR SPECIAL POPULATIONS

A voice version provides synthesized speech where needed.

Name of Program LESSONS IN ALGEBRA

Make and Model of Computer on
Which it is Used Apple Plus 2

FOR SALE

yes ☒ no ☐

$29.95

Order from:

George Earl (Computerland)
1302 S. General McMullens
San Antonio, TX

DEVELOPER

n/a

CONTACT PERSON

n/a

VOCATIONAL AREA(S)

Material includes beginning elements of algebra: sets, number properties, postulates, exponents, and radicals. Used in basic skills.

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

n/a

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MILLIKEN MATH

Make and Model of Computer on Which it is Used Apple II+ and IIe

FOR SALE

yes ☒ no ☐

Order from:

Milliken Publications
1100 Research Blvd.
St. Louis, MO 63132
(314) 991-4220

DEVELOPER

n/a

CONTACT PERSON

Christine Krueger
Franklin High School
8222 S. 51st St.
Franklin, WI 53132
(414) 421-3000

VOCATIONAL AREA(S)

Math

FOR WHICH STUDENTS

- Regular
- Handicapped
- Disadvantaged
- Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

1-8 Math program covering 4 basic operations, decimals, percents, fractions, measurement and equations. Can program student for any number of problems. Takes them through a step by step process. Good management program.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program PERCEPTION 3.0

Make and Model of Computer on Which it is Used Apple II or II Plus

FOR SALE

yes ☒ no ☐
$24.95

Order from:

Edu-Ware Services
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Mathematics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

PERCEPTION 3.0 challenges your visual judgement and sharpens your hand-eye coordination with seven high resolution games.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program READ AND SOLVE MATH PROBLEMS

Make and Model of Computer on
Which it is Used Apple Plus 2

FOR SALE

yes ☒ no ☐
$85.00

Order from:

Educational Activities
P.O. Box 392
Freeport, NY 11520

DEVELOPER

n/a

CONTACT PERSON

n/a

VOCATIONAL AREA(S)

Basic Skills
Pre-vocational

FOR WHICH STUDENTS

Regular
Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

n/a

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program SRA COMPUTER DRILL AND INSTRUCTION MATHEMATICS LEVEL C

Make and Model of Computer on Which it is Used Apple Plus 2

FOR SALE

yes ☒ no ☐

$530.00

Order from:

Science Research Assoc.
155 N. Wacker Dr.
Chicago, IL 60606

DEVELOPER

n/a

CONTACT PERSON

n/a

VOCATIONAL AREA(S)

Basic Skills

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The program is used on an individualized basis as a basic math review or basic math tutoring program. Followup is done through the use of teacher made worksheets which highlight the lessons the student has completed.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

MISCELLANEOUS

Administrative Planning System^{tm} (APS) 129

CAIWARE-3D CAI/DMI Authoring System 130

A Computerized Individual Vocational Education Program for Disadvantaged Learners 131

I CARE 132

Individualized Planning System ^{tm} (IPS) 137

Intake: A New Approach 138

Large Print Computer (LPC), hardware (not software) 139

Rendezvous 140

Typing Communication Game 141

Vic Writer 3 142

Video Controller for Controlling Interaction Between A Computer and Videotape Player/Recorder and Screen 144

Word Processing Training Program 145

Name of Program ADMINISTRATIVE PLANNING SYSTEM^{TM} (APS)

Make and Model of Computer on Which it is Used Apple II & III, IBM PC, DEC 325 & 350

FOR SALE

yes ☒ no ☐

Order from:

Learning Tools
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086 or local software distributor

DEVELOPER

Learning Tools
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086

CONTACT PERSON

Joan Thormann
685 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086

VOCATIONAL AREA(S)

Student or client information management

FOR WHICH STUDENTS

- Regular
- Handicapped
- Disadvantaged
- Slow Learner

PROGRAM FORMAT

Data Management

PROGRAM DESCRIPTION

APS is an easy to use, flexible, user-definable student or client information management system. APS prints user-definable reports and provides answers to administrative inquiries such as student/client counts, due process compliance and reimbursement analysis. Student/client records maintained with the Individualized Planning System^{TM} (IPS) are automatically updated. This program can be used by administrators in educational and social service settings.

MODIFICATIONS FOR SPECIAL POPULATIONS

Name of Program CAIWARE-3D CAI/CMI AUTHORING SYSTEM

Make and Model of Computer on Which it is Used TRS-80 Model I or III disk

FOR SALE

yes ☒ no ☐

Order from:

Fireside Computing, Inc.
5843 Montgomery Rd.
Elkridge, MD 21227

DEVELOPER

Fireside Computing, Inc.
5843 Montgomery Rd.
Elkridge, MD 21227
(301) 796-4165

CONTACT PERSON

Don Coyne
Fireside Computing, Inc.
5843 Montgomery Rd.
Elkridge, MD 21227
(301) 796-4165

VOCATIONAL AREA(S)

All

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

CAIWARE-3D is a computer-managed instruction (CMI) system with built-in CAI Authoring System, as well as word-processing and graphics functions. Text screens may be intermixed with questions and graphics. Student's performance is recorded on a Response File which is matched against a Syllabus File to schedule lessons day-to-day. No programming experience is required for subject matter experts to develop courseware with this easy-to-use, screen-formatted approach to lesson development. Lesson material and student's progress reports may be printed out.

MODIFICATIONS FOR SPECIAL POPULATIONS

This is a general purpose system. It may be used for any subject matter, and any school population above a third grade level.

Name of Program A COMPUTERIZED INDIVIDUAL VOCATIONAL EDUCATION PROGRAM FOR DISADVANTAGED LEARNERS

Make and Model of Computer on Which it is Used TRS-80 Model III

FOR SALE

yes ☒ no ☐

Order from:

Pam Richard
Vocational Resource Rm.
Somersworth High School
Somersworth, NH 03878

DEVELOPER

Richard-Lichtenstein
and Steven
Palmer House
Univ. of New Hampshire
Durham, NH 03824
(603) 862-1392

CONTACT PERSON

Stephen Lichtenstein
Palmer House
Univ. of NH
Durham, NH 03824
(603) 862-1392

VOCATIONAL AREA(S)

14 vocational courses:
Individualizes Teacher recommendations.
Trade and Industry
Agriculture
Business & Office
etc.

FOR WHICH STUDENTS

Disadvantaged

PROGRAM FORMAT

Teacher management

PROGRAM DESCRIPTION

This is not instruction, it is management. Student Profile is input (WRIOT, course analysis, PIAT, Valpar). Output is in the form of recommendations to the teacher on improving the delivery of instruction, etc.

MODIFICATIONS FOR SPECIAL POPULATIONS

Project originally funded by a 94-482 Disadvantage Grant.

Name of Program I CARE

Make and Model of Computer on Which it is Used TRS-80 Model I and III, 16K

FOR SALE

yes ☒ no ☐

Order from:

Blue Mountain School Dist
Red Dale Rd.
Orwigsburg, PA 17961
(717) 366-0515

DEVELOPER

Robert Cope
366 Washington St.
Frackville, PA 17931
(717) 874-2766

CONTACT PERSON

Victor A. Miller
Blue Mountain S.D.
Red Dale Rd.
Orwigsburg, PA 17961
(717) 366-0515

VOCATIONAL AREA(S)

All areas

FOR WHICH STUDENTS

Disadvantaged
Slow Learners

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The I CARE Project is an individualized and computer assisted program for providing basic reading instruction to grade 10, 11, and 12 vocational education students. Each student participating in the program works with computer-assisted programs, audio-visual reading programs, audio tapes and worksheets, and paperback books.

Using a pre-test - post-test control group design, 95 randomly selected grade 10, 11, and 12 vocational education students significantly outperformed 95 similar students on Vocabulary and Reading Comprehension subtests of the American School Achievement Tests. Treatment effects accounted for over 25% of the variability in the data and gains were 1.5 and .64 standard deviations for the vocabulary and reading comprehension respectively. (continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

132

Feature of Program

This project is an effort to supplement the existing reading program for the educationally deprived high school vocational education students with a method of individualized instruction and small group instruction using both audio and visual aids. The instruction is individualized through the use of a microcomputer. This allows each student to set his or her own learning pace.

Each student participating in the experimental group was required to spend a 50-minute class period each day completing the following material:

1. A minimum of 30 computerized vocabulary programs. Each student was required to achieve a score of 80 per cent before going on to the next program.
2. A minimum of 30 computerized reading programs. Each student was required to achieve a score of 80 per cent before proceeding to the next program. Each time a student scored 100 per cent on a reading program, the reading speed of the next program was increased.
3. A minimum of 25 audio-visual reading programs.
4. A minimum of 10 audio tapes with accompanying worksheets.
5. A minimum of two paperbound books of the student's choice.

Each student spent one week in each of the five areas on a rotating basis. This was done to avoid boredom and potential discipline problems that might arise from continually using the same machine for an extended period of time.

The I CARE Project is based on traditional individualized instruction. This instruction is enhanced through the use of microcomputers and visual aids.

Dissemination/Replication

A. Adoption Considerations

The I CARE Project has received Pennsylvania validation and has been replicated successfully in Pennsylvania. Systems contemplating adoption of I CARE should consider placing a person or committee in charge. This person, whether a Principal, Teacher, or Aide would be responsible for upkeep of equipment, developing a cassette tape resource file, and lab scheduling for student use. A district steering committee could serve in place of a Principal, Teacher, or Aide.

Adoption would require at least one one-day workshop (or multiple workshops of equivalent time) by a Project Staff Member for orientation and training. Other workshops on the use of the equipment could be scheduled on an as-needed basis. Most computer dealers will provide this training as part of the cost of the computer.

This project can provide guidance to other interested districts because it was designed for easy adaptability. The instructional methodology and resources provide a skeleton upon which each district can build. This program can be instituted in total or substantially modified very easily. It is an open-ended project.

B. Costs

All one needs to get started is one Microcomputer, a few cassette tapes/disks, and one interested Teacher. The Teacher does not need a background in the operation of microcomputers or computer literacy to function well. If Teacher knows the keys on a typewriter, this can be a plus, because keyboards are the same. Operational manuals supplied with the microcomputer are enough to train a proficient operator. Money can be saved by using an Aide full or part-time for this function. Many companies (Radio Shack, Apple, IBM) offer free training workshops for Teachers.

A summary of the installation and continuation costs are summarized in the following table

Program Implementation
Minimum Cost Summary

I CARE Cost Summary

	Installation (Non-Recurring Costs)	Subsequent Years (Recurring Costs)
Personnel*	$4,000.00	$4,000.00
Personnel Training	200.00	------
Facilities	One Storage or Classroom	
Equipment (Microcomputer)	850,00	------
Tapes and Supplies	500.00	200.00
TOTAL	$5,550.00	$4,200.00
Cost/Participant*	$ 185.00	$ 140.00

The cost of personnel could be for an Aide or a part-time Teacher to maintain the equipment and the resource file. The cost per participant in the table reflects the cost for 30 students over a one-year period. Costs would be reduced as the number of students increases because the only additional resource would be more computers. Thus, the cost/participant would be $107.00 and $70.00 for 60 participants, $81.00 and $47.00 for 90 participants, etc. for installation and subsequent year costs respectively.

I CARE (contd.)

C. Function of the Aide

1. Set up the schedules of the students participating in I CARE in conjunction with subject matter teacher.
2. Pre-test and post-test students participating in I CARE.
3. Responsible for instructing students in the use and care of microcomputers.
4. Responsible for maintaining records for all students.

Implementation

Diversity is the key word in implementing the I CARE Project. The people charged with the operation of the program are constantly striving for a multi-sensory, omni directional approach, involving as many students and teachers as possible in the creation and development of new ideas. The following is a list of ways in which the I CARE Project is currently interacting with both students and teachers.

1. Dittoed math worksheets may be requested from the Resource Room to supplement class work or to remediate certain skill areas.
2. Students may come to the Resource Room during a study hall and receive extra credit for the work that they accomplish.
3. Teachers may arrange their class schedule to enable students to come to the Resource Room for remediation.
4. Students may use the Resource Room to review material and strengthen concepts that are currently being taught in class.
5. Students may, at the request of a teacher, be given tests to determine their areas of strength and weakness.
6. Students having severe deficiencies may be placed in the Resource Room for extended periods of time ranging from six-weeks to a full semester.
7. Students in the enrichment program produce computer programs for students in the remedial program.
8. New methods of using the Resource Room and its materials may be discussed by contacting the Project Director.

Since its inception in 1979, I CARE has logged 14,210 student hours in remedial work. As it continues to evolve and broaden its scope, it is hoped that I CARE will be able to help more students in a wider range of subject matter areas.

Summary

The I Care Project is a statistically and educationally significant program for improving the performance of grade 10, 11, and 12 vocational education students in Vocabulary and Reading Comprehension. Considering the potential benefits, it is cost effective to install and becomes more so as the number of participants increases and it is used. The Blue Mountain High School uses the program effectively for no more than $37.00 per student.

I CARE (contd.)

The Blue Mountain School District is prepared to support the diffusion of the I CARE Project through the commitment of its instructional staff, reproduction facilities, and space for workshop training. The project director is prepared to share educational materials and processes through meetings with interested district administrators and workshops for teachers.

Teacher observations of audio-visual equipment and parent materials are available for review by any interested persons at the Blue Mountain High School Remedial Lab. Blue Mountain High School is available as a model program for observation. Computer software which has been developed for the program is available.

This software includes Courseware Developing Systems. No previous Computer experience is necessary to create I CARE or Teacher selected courseware.

The following master programs have been developed to enable teachers to author their own programs in Vocabulary, Spelling, and Speed Reading and Comprehension.

At the conclusion of each program, the student is given a percent grade.

Master Program for Speed Reading and Comprehension	$ 50.00
Master Program for Vocabulary Development	$ 50.00
Master Program for Spelling	$ 50.00
Three Programs for -	$125.00

Use with TRS-80 Cassette Systems. They can be programmed for Disk Systems and with a few changes, can be used on other Microcomputer Systems.

Name of Program INDIVIDUALIZED PLANNING SYSTEM^{tm} (IPS)

Make and Model of Computer on Which it is Used Apple II & III, IBM PC, DEC 325 & 350

FOR SALE

yes ☒ no ☐

Order from:

Learning Tools
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086 or local software distributor

DEVELOPER

Learning Tools
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086

CONTACT PERSON

Joan Thormann
686 Massachusetts Ave.
Cambridge, MA 02139
(617) 864-8086

VOCATIONAL AREA(S)

Data management and individualized goal planning

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Information management and individualized program planner

PROGRAM DESCRIPTION

IPS adapts and expands to meet the users' individual information management and report writing needs. Authorized staff may access information in seconds and generate user-defined reports in minutes. IPS can be used with Curriculum Management System^{tm} (CMS) files for convenient individualized goal planning and with Administrative Planning System ^{tm} (APS) records for automatic updating of administrative information. This software can be used by administrators, teachers, counselors and clinicians.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program INTAKE: A NEW APPROACH

Make and Model of Computer on Which it is Used Apple II+

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Idaho Department of Employment
317 Main
P.O. Box 35
Boise, ID 83735
(208) 334-3513

CONTACT PERSON

LaVerne Guches
Max Burke
Idaho Dept. of Employment
317 Main
P.O. Box 35
Boise, ID 83735
(208) 334-3513

VOCATIONAL AREA(S)

On-the-Job Training

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Idaho has 26 local Job Service offices located throughout the state. Because of training and travel funding cutbacks, it is becoming increasingly difficulty to provide quality education for new and experienced employees so that they can do their jobs well. CAI is an answer to these training delivery concerns. This course is designed to teach staff how to properly register people who want Job Placement or Unemployment Insurance assistance.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program LARGE PRINT COMPUTER (LPC), hardware (not software)

Make and Model of Computer on Which it is Used Proprietary computer system

FOR SALE

yes ☒ no ☐

Order from:

Visualtek, Inc.
1610 26th St.
Santa Monica, CA 90404
(213) 829-6841

DEVELOPER

Visualtek, Inc.
1610 26th St.
Santa Monica, CA 90404
(213) 829-6841

CONTACT PERSON

James McCarthy
Visualtek, Inc.
1610 26th St.
Santa Monica, CA 90404
(213) 829-6841

VOCATIONAL AREA(S)

General purpose

FOR WHICH STUDENTS

Handicapped (visual)

PROGRAM FORMAT

See notes below

PROGRAM DESCRIPTION

The Visualtek Large Print Computer is a general purpose microcomputer, in the TRS-80 class, which can be used free-standing or as a terminal. It produces large-print displays, with letters up to 4" high, at extremely high speed so that visually handicapped (legally blind) students can function as effectively as their fully-sighted peers. Because the product is new, programs for the system are not generally available, but purchasers can develop their own vocational and instructional programs for legally-blind students, or can use any such program which will operate on a TRS-80 (the LPC is fully compatible).

MODIFICATIONS FOR SPECIAL POPULATIONS

See information above.

Name of Program RENDEZVOUS

Make and Model of Computer on
Which it is Used Apple II or II Plus

FOR SALE

yes ☒ no ☐
$39.95

Order from:

Edu-Ware Services
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Simulation

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Simulation

PROGRAM DESCRIPTION

RENDEZVOUS simulates an actual space shuttle flight in four phases from Earth Liftoff, through Orbital Rendezvous and Approach, to Alignment and Docking

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program TYPING COMMUNICATION GAME

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☐ no ☒

Order from:

A marketing arrangement is being developed.

DEVELOPER

Patrick Dickson
Wisconsin Center for Education Research
Ed. Science Bldg.
1025 W. Johnson St.
Madison, WI 53706
(608) 263-4236

CONTACT PERSON

Patrick Dickson
Wisconsin Center for Education Research
Ed. Science Bldg.
1025 W. Johnson St.
Madison, WI 53706
(608) 263-4236

VOCATIONAL AREA(S)

General: This program is in the research and development stage: it is directed toward developing communication skills in hearing impaired students using a keyboard to communicate.

FOR WHICH STUDENTS

Handicapped

PROGRAM FORMAT

Communication game

PROGRAM DESCRIPTION

This communication is an adaptation of a communication game developed originally for use with hearing children in elementary school. The adaptation permits the use of the keyboard to type messages, making it accessible to hearing impaired students. The way the game works is as follows: sets of pictures appear on the screen and one player must type a description of the target picture so that the other player must type a description of the target picture so that the other player can identify it. The program encourages specificity of descriptions. Given importance of communication skills, especially for hearing impaired students, the game has some potential. A pilot study with high school and middle school age hearing impaired students was well received by the students and their teachers.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program VIC WRITER 3

Make and Model of Computer on Which it is Used Vic 20--with 8KRAM Pack Data Sette recorder and modified joystick

FOR SALE

yes ☒ no ☐

Order from:

James Keefe
714 N. Ninth St.
Monmouth, IL 61462
(309) 734-5749

DEVELOPER

James Keefe
714 N. Ninth St.
Monmouth, IL 61462
(309) 734-5749

CONTACT PERSON

James Keefe
714 N. Ninth St.
Monmouth, IL 61462
(309) 734-5749

VOCATIONAL AREA(S)

n/a

FOR WHICH STUDENTS

Handicapped

PROGRAM FORMAT

Communication

PROGRAM DESCRIPTION

This program provides a communication system for non-vocal physically handicapped persons. A single switch press is required, but modified versions for persons who can use a joystick-type controller are available. Spelling, customized word and phrase selection, number selection, calling tone, printer output and error correction are standard.

In operation, the program is loaded via cassette recorder by an assistant and remains available to the user until the assistant turns the computer off or loads a different program. (continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

Modifications include:

1. Varied input forms
2. Customized vocabulary

VIC WRITER 3 (contd.)

The initial screen display shows the letters of the alphabet, the numbers 0 through 9 and control symbols for space, erase letter, printer output, and calling tone. A cursor moves at a variable rate--user controlled if two different switch presses or joystick positions are possible--horizontally across four rows of characters. At the beginning of each line, the user may select a vertical drop of one line.

After a character has been selected, the cursor returns to the upper left corner of the screen and begins the horizontal scan.

Characters selected are placed in the lower half of the screen. Up to 220 selected characters and spaces may be on the screen prior to an automatic printer dump. The printer may be selected at any time.

Words are available if the selector switch is pressed when the cursor includes a "w". This can be customized, but is usually available at the beginning of a scan. Ten "pages" of words and phrases can be accessed. These are customized by the use of data statements. Verification of a selected word or phrase is required, and permits easy erasure of errors. The printer routine can also be used to clean the screen without printing.

The program is currently in use by an eleven year old cerebral palsied boy. Additionally, three game programs, "Space Blasters", "Hangman" and "Simon" have been developed.

Name of Program VIDEO CONTROLLER FOR CONTROLLING INTERACTION BETWEEN A COMPUTER AND VIDEOTAPE PLAYER/RECORDER AND SCREEN

Make and Model of Computer on Which it is Used Apple II, IBM-PC, and Franklin ACE1000

FOR SALE

yes ☒ no ☐

Order from:

Dr. William F. Morton
9 Lake Bellevue Dr. #118
Bellevue, WA 98005
(206) 451-1810

DEVELOPER

User Resources
12729 NE 20th, Suite 25
Bellevue, WA 98005
(206) 451-0559

CONTACT PERSON

Dr. William F. Morton
9 Lake Bellevue Dr. #118
Bellevue, WA 98005
(206) 451-1810

VOCATIONAL AREA(S)

Any

FOR WHICH STUDENTS

n/a

PROGRAM FORMAT

n/a

PROGRAM DESCRIPTION

Electronically counts frames on the second auditory track, searches for and checks frame numbers for beginning or end of any prescribed video scene. Used with CourseMaster, the designer can develop interactive video courses and then edit the courses later as information changes or is updated.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program WORD PROCESSING TRAINING PROGRAM

Make and Model of Computer on Which it is Used CPT 6100

FOR SALE

yes ☒ no ☐

Order from:

CPT Office Tech.
2129 S. Oneida St.
Green Bay, WI 54304
(414) 494-1266

DEVELOPER

Barb Vander Putten
CPT Office Tech.
2129 S. Oneida St.
Green Bay, WI 54304
(414) 494-1266

CONTACT PERSON

Sue Mauel or
Wendy Hawks
Curative Workshop
Green Bay, WI 54308
(414) 468-1161 ext. 123

VOCATIONAL AREA(S)

To place people into word processing jobs.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Drill and Practice
Word Processing Concepts

PROGRAM DESCRIPTION

Individualized instruction on the use of the word processor. Each client signs up for an hour a day. There is a word processing instructor on hand if clients have questions. After six weeks of training, we find another site in Green Bay for them to work at which is strictly word processing; this is considered followup. The people from Office Tech. are always available to use when there are problems as well as if new equipment comes out. (continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

WORD PROCESSING TRAINING PROGRAM (contd.)

Word Processing is a new and rapidly expanding field... that offers many advancement opportunities. Our Word Processing Training Program helps individuals, who possess good English and typing skills, attain the knowledge and skills needed to enter this field.

Eligibility Requirements

Participants in this program must:

- Be eligible according to the guidelines set down by the program's funding source
- Type a minimum of 40 WPM
- Score at least 80% on a English test which covers: vocabulary, grammar, punctuation and spelling

Classroom Instruction

Six weeks are devoted to individualized classroom training.

Units of Study

- Word Processing Concepts
- Machine Transcription
- English Review
- Math Review
- Filing
- Duplicating
- Proofreading
- Calculation

Field Experience

During the last four weeks of training, participants are placed in a field experience site in the business community. The purposes of this activity are to:

- Continue training
- Gain hands-on experience
- Apply for a job, should an opening occur
- Attain a recent work history
- Earn a recommendation from the field-experience supervisor that can be used on future job applications

Training Allowance

Program funding provides training money for participants while they are enrolled in the program. Experience-site employers are asked only to provide supervision and training during each four-week period.

PREVOCATIONAL

Adult Basic Education 149

Comprehension Power Levels D-E-F and G-H-I 150

IPASS - Individualized Prescriptive Arithmetic Skills System Computer Assisted Mathematics 151

Spelltronics 153

Word Structure A-H 154

Name of Program ADULT BASIC EDUCATION

Make and Model of Computer on Which it is Used Can be implemented by using nearly all word processors or microcomputers.

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Information provided by

Erica McIntire
Dist. One Tech. Inst.
620 W. Clairemont Ave.
Eau Claire, WI 54701
(715) 836-3900

CONTACT PERSON

Erica McIntire
Dist. One Tech. Inst.
620 W. Clairemont Ave.
Eau Claire, WI 54701
(715) 836-3900

VOCATIONAL AREA(S)

Prevocational

FOR WHICH STUDENTS

Disadvantaged
Slow Learner

PROGRAM FORMAT

PROGRAM DESCRIPTION

To better illustrate the relationship between reading and writing, instructor elicits story or description from student orally and types into computer. Text becomes reading material for student and all grammar corrections are made and described thru use of commercial word processing program.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COMPREHENSION POWER LEVELS D-E-F and G-H-I

Make and Model of Computer on
Which it is Used Apple Plus 2

FOR SALE

yes ☒ no ☐
$425.00 per level
Order from:
Milliken Publishing Co.
1100 Research Blvd.
St. Louis, MO 63132

DEVELOPER

n/a

CONTACT PERSON

Fay Wagner
Lakeshore Tech. Inst.
1290 North Ave.
Cleveland, WI 53015
(414) 458-4183

VOCATIONAL AREA(S)

Pre-vocational
Basic Skills

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

After the student has successfully completed our Reader's Digest 2000 series, he/she is set before the Apple. I then work with the student on the first story. After we have worked one story thru the student is on his/her own. The program has its own management system. This aids in checking the student's progress. The student has a comprehension power chart on which is recorded what types of questions are missed. When one type of question is missed often, the student is placed in material dealing with that type of question. Upon completion of the Power program the student is evaluated as to rate increase and comprehension increase.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program IPASS - INDIVIDUALIZED PRESCRIPTIVE ARITHMETIC SKILLS SYSTEM COMPUTER ASSISTED MATHEMATICS

Make and Model of Computer on Which it is Used TRS-80-III

FOR SALE

yes ☒ no ☐

Order from:

Robert Reynolds
Pawtucket School Dept.
Park Place
Pawtucket, RI 02860

DEVELOPER

Robert R. Reynolds
Dir. Project IPASS
Pawtucket School Dept.
Park Place
Pawtucket, RI 02860

CONTACT PERSON

Robert R. Reynolds
Dir. Project IPASS
Pawtucket School Dept.
Park Place
Pawtucket, RI 02860

VOCATIONAL AREA(S)

Can be used to develop prevocational math skills

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

n/a

PROGRAM DESCRIPTION

I. IPASS is a computer managed criterion referenced testing and instructional program in basic mathematical skills, covering grades 108 which has been funded for dissemination by the National Diffusion Network.

II. What is included in IPASS?
   A. There are 159 objectives.
   B. There are 35 pre and 35 post tests for the program.
   C. There is a computer management system to provide:
      1. Immediate feedback and test correction.
      2. Diagnosis of specific skill deficiency.
      3. Prescription for remediation of specific skill deficiency.

(continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

IPASS (contd.)

    4. Printed copy of the test responses, correction, diagnosis, and prescription.

- D. Student Profile Sheets.
- E. Instructional Resource File.
- F. Instructional Level Placement Device.

Procedures

1. Student is placed at the lowest entering point for a grade level as indicated by a standardized test. Placement chart is provided in the program. STANDARDIZED TEST
2. Student completes initial pretest. PRETEST
3. Student enters pretest responses on the computer. Each response is evaluated as it is entered. ENTER RESPONSES
4. The computer displays a diagnosis of specific learning difficulties and then identifies them by objective. PRINTOUT OF ANSWERS AND OBJECTIVES.
5. The teacher aide then checks the prescription and selects remediation activities which can include computer assisted instructional programs, worksheets, textbooks or math activities. REMEDIATION

Remediation

1. An Instructional Resource File is available for each pre and post test. The materials within this file are organized by objectives:
    - a) Approximately five major textbooks in mathematics have been correlated by objective and page number.
    - b) A series of cassette tapes and ditto worksheets have been correlated to the objectives by number.
    - c) Computer Assisted Instruction Programs have been correlated to each objective where available.
    - d) Additional materials, such as tactile materials, may be added by the teacher.
    - e) An annual updating process has been undertaken to keep this file current and varied.

Recordkeeping

1. A student folder is prepared for each student in the program. This folder should contain:
    - a) Student Identification
        - 1) Name
        - 2) Age and date of birth
        - 3) School
        - 4) Grade/Level
        - 5) Standardized test score and date of test
        - 6) Entry point of IPASS program and date
        - 7) Student Profile Sheet(s)
        - 8) Copies of each printout and remedial activities
2. This folder should follow the student during his or her participation in the IPASS program. It should be updated at each grade/level.

Name of Program SPELLTRONICS

Make and Model of Computer on Which it is Used Apple Plus 2

FOR SALE

yes ☒ no ☐

$65.00

Order from:

Educational Activities
P.O. Box 392
Freeport, NY 11520

DEVELOPER

n/a

CONTACT PERSON

Fay Wagner
Lakeshore Tech. Inst.
1290 North Ave.
Cleveland, WI 53015
(414) 458-4183

VOCATIONAL AREA(S)

Pre-vocational
Basic Skills

FOR WHICH STUDENTS

Regular
Slow Learner

PROGRAM FORMAT

Drill and Practice

PROGRAM DESCRIPTION

The program is introduced by having the student work through the first lesson with the instructor. The program is used to reinforce spelling rules. The only followup done is to check all work submitted for spelling errors.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program WORD STRUCTURE A-H

Make and Model of Computer on Which it is Used Apple Plus 2

FOR SALE

yes ☒ no ☐
$600.00

Order from:

Borg-Warner Ed. Systems
600 W. University Dr.
Arlington Heights, IL
60004

DEVELOPER

n/a

CONTACT PERSON

Fay Wagner
Lakeshore Tech. Inst.
1290 North Ave.
Cleveland, WI 53015
(414) 458-4183

VOCATIONAL AREA(S)

Basic Skills
Pre-vocational

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

The student is introduced to the program by working thru the first lesson. The program is used as a tutorial program to review basic English skills. To follow-up the program the student will work on teacher made activities.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

READING

Admiral King Vocational Reading 157

C.A.I. for Academically Disadvantaged Youth in Phenix City, AL 158

Compu-Read 3.0 159

Compu-Spell 160

Critical Reading 161

Diascriptive Reading 162

PSAT Word Attack Skills 163

Reading for Low Performing Adults 164

Spelling Bee and Reading Primer 165

Work/Study Project 166

Name of Program ADMIRAL KING VOCATIONAL READING

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

MECC Publications and Programs
2520 Broadway Dr.
St. Paul, MN 55113
(612) 376-1118

DEVELOPER

MECC Publications and Programs
2520 Broadway Dr.
St. Paul, MN 55113
(612) 376-1118

CONTACT PERSON

Paul Biber
2229 E. 30
Lorain, OH 44055
(216) 277-6484

VOCATIONAL AREA(S)

Electronics
Auto Mechanics
Welding
Distributive Education
Small Engine Repair

FOR WHICH STUDENTS

Handicapped

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

It is used as enrichment and reinforcement for basic vocabulary skills (suffix and prefix, homonyms, spelling, etc.) Pre-assessment is from in class performance on material such as Barnell-Loft "Working with Sounds" and post-assessment is done through later units in the same booklet.

MODIFICATIONS FOR SPECIAL POPULATIONS

We use only material at the skill level of the students involved. Actual operation of the keyboard, etc. has been no problem. It is a very motivating tool. We use MECC software.

Name of Program C.A.I. FOR ACADEMICALLY DISADVANTAGED YOUTH IN PHENIX CITY, AL

Make and Model of Computer on Which it is Used Commodore C-64

FOR SALE

yes ☒ no ☐

Order from:

Phenix City Area Vo. Ctr.
2400 Dobbs Dr.
Phenix City, AL 36867
(205) 298-7684

DEVELOPER

Phenix City Area
Voc./Tech. Ctr.
2400 Dobbs Dr.
Phenix City, AL 36837
(205) 298-7684

CONTACT PERSON

George A. Martin
Phenix City Area
Voc./Tech. Ctr.
2400 Dobbs Dr.
Phenix City, AL 36837
(205) 298-7684

VOCATIONAL AREA(S)

Vocational related reading

FOR WHICH STUDENTS

Disadvantaged

PROGRAM FORMAT

Tutorial
Testing & Prescription

PROGRAM DESCRIPTION

Our program consists of a computer assisted instruction adaptation of the "CRI Reading" from Mason, Michigan. The assessment phase has been developed for testing and placement into the modules. The individual modules are under development by staff members who are completing a course from Auburn University Media Dept. on the use of CAI Curriculum. The Pilot language is being used. Since this program is under development, research relating to its success will not be available until later.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COMPU-READ 3.0

Make and Model of Computer on
Which it is Used Apple II or II Plus, Atari BASIC

FOR SALE

yes ☒ no ☐

Order from:
Edu-Ware Services

$29.95 Apple Disk, $29.95 Atari Disk, $19.95 Atari Cassette

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Language Skills

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Four Learning Modules develop and strengthen reading skills such as Letters, Words, Synonyms and Antonyms, and Sentences.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program COMPU-SPELL

Make and Model of Computer on
Which it is Used Apple II & II Plus, DOS 3.2 or 3.3

FOR SALE

yes ☒ no ☐
$29.95
Order from:
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Language Skills

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

The COMPU-SPELL system offers the following features: monitors each individual learner's progress and updates the learner's position; displays text and graphics in high-resolution; displays all spelling words in sentence context; and retains a list of "review words" for each learner from those recently missed.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program CRITICAL READING

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

Borg-Warner
Educational Systems
600 W. University Dr.
Arlington Heights, IL
60004-1889

DEVELOPER

n/a

CONTACT PERSON

Kathy T. Witherup
Withrow High School
2488 Madison Rd.
Cincinatti, OH 45208

VOCATIONAL AREA(S)

All

FOR WHICH STUDENTS

Handicapped
Disadvantaged

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Used as practice after teaching "Inference or Draw Conclusions". It teaches and [enables the student to] practice. It isn't designed for any vocational area in particular. We use it for every program.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program DIASCRIPTIVE READING

Make and Model of Computer on Which it is Used TRS-80 Model III

FOR SALE

yes ☒ no ☐

Order from:

Educational Activities

DEVELOPER

Dorak Industries
P.O. Box 175
Beecher Falls, VT 05902
(802) 266-3582

CONTACT PERSON

Norma Chenevert
Colebrook Academy
Box 119
Colebrook, NH 13576
(603) 237-8351

VOCATIONAL AREA(S)

All for reading and math improvement

FOR WHICH STUDENTS

Handicapped
Disadvantaged

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Students with reading and math academic problems often have difficulty in all their programs.

I also use computer games to motivate, practice organizational skills and to plan ahead.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program PSAT WORD ATTACK SKILLS

Make and Model of Computer on Which it is Used Apple II or II Plus

FOR SALE

yes ☒ no ☐
$49.00

Order from:

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Language Skills

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

PSAT and SAT WORD ATTACK SKILLS are tutorials which give college-bound students an edge on mastering vocabulary, deciphering new or unfamiliar words, and taking tests. Specifically, it prepares the user for the "antonyms" portion of the Scholastic Achievement Test.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program READING FOR LOW PERFORMING ADULTS

Make and Model of Computer on
Which it is Used TRS-80

FOR SALE

yes ☒ no ☐

Order from:

Dr. Paul A. Myers
201 E. 11th St.
Austin, TX 78701
(512) 834-4165

DEVELOPER

Dr. David F. Culclasure
San Antonio State School
Box 23310, Highland Hills
Station
San Antonio, TX 78223
(512) 532-8811 ext. 1346

CONTACT PERSON

Dr. Paul A. Myers
201 E. 11th St.
Austin, TX 78701
(512) 834-4165

VOCATIONAL AREA(S)

Special Populations

FOR WHICH STUDENTS

Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Teacher orientation on use of microcomputer, practice drills, and then student use of programs. Available on cassettes or diskettes.

MODIFICATIONS FOR SPECIAL POPULATIONS

Program is designed to help low-performing adults to improve reading skills. Some reading ability is necessary to use the system.

Name of Program SPELLING BEE AND READING PRIMER

Make and Model of Computer on Which it is Used Apple II or II Plus, DOS 3.3

FOR SALE

yes ☒ no ☐

Order from:

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

DEVELOPER

Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

CONTACT PERSON

Kim Taylor
Edu-Ware Services, Inc.
28035 Dorothy Dr.
P.O. Box 22222
Agoura, CA 91301
(213) 706-0661

VOCATIONAL AREA(S)

Educational
Language Skills

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

SPELLING BEE and READING PRIMER are two companion programs which cover: double vowels/consonants, simple two- and three-letter words, four-letter, one-syllable words, simple and difficult multi-syllable words, and more.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program WORK/STUDY PROJECT

Make and Model of Computer on Which it is Used Apple II Plus/CDC Plato

FOR SALE

yes ☐ no ☒

Order from:

available upon request

DEVELOPER

Judith Beerbaum
382 Linden St.
Fond du Lac, WI 54935
(414) 929-2754

CONTACT PERSON

Judith Beerbaum
382 Linden St.
Fond du Lac, WI 54935
(414) 929-2754

VOCATIONAL AREA(S)

Career Decisionmaking
Computer Assessment and Planning Program
Basic Skill Building
GED Preparation
Coping Skills
Programming (Basic)

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

PROGRAM FORMAT

Drill and Practice
Tutorial
Problem Solving

PROGRAM DESCRIPTION

Located in the high school Guidance Department, the project solicits "high risk" student referrals from teaching, counseling and attendance staff. Pretesting is administered to determine student's level of learning and placement into various programs, as appropriate. Post tests are given to determine student achievement. Individual life/work plans are written with the student to help identify the knowledge, skills and abilities necessary to obtain and maintain employment.

MODIFICATIONS FOR SPECIAL POPULATIONS

One half hour is used for CAI and the remainder of the hour is used as a reward, where educational games are "played" on either system.

TRADES AND INDUSTRY

ARC Welding and Related Review 169

Automotive Technician Mathematics, Volume I - Arithmetic 170

CAIVEP, Computer Assisted Individual Vocational Education Plan 172

Drafting, Electronics 173

Electronics I Final Exam Review 174

Machine Shop Review 175

Microcomputer Applications in Vocational Education: Trades and Industry 176

Milwaukee Area Technical College - Computer Assisted Drafting . . 178

NORPLOT 179

Occupational Reading Instructional Modules Project 180

Quick Score 198

Rent/Own 200

Transistor Biasing Lesson 201

Name of Program ARC WELDING AND RELATED REVIEW

Make and Model of Computer on Which it is Used Apple II Plus 48K DOS 3.3

FOR SALE

yes ☒ **no** ☐

$29.95

Order from:

Hobar Publications
1234 Tiller Lane
St. Paul, MN 55112

DEVELOPER

W. Forrest Bear
University of Minn.
St. Paul, MN 55108

CONTACT PERSON

Donavan Jones
Clinton Community
School District
P.O. Box 566
Clinton, WI 53525
(608) 676-2223

VOCATIONAL AREA(S)

Metalworking
Welding
Agriculture
General Metals

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Testing and Review

PROGRAM DESCRIPTION

For testing and review with student interaction and immediate reinforcement as to correct or incorrect response. There are 444 questions covering the following categories: MIG Welding; TIG Welding; Metallurgy related; Electrodes; and ARC stick.

There is adequate written documentation sent along with program for both student and instructor.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program AUTOMOTIVE TECHNICIAN MATHEMATICS, VOLUME 1 - ARITHMETIC

Make and Model of Computer on Which it is Used Apple II

FOR SALE

yes ☒ no ☐

Order from:

MECC Distribution Center
2520 Broadway Dr.
St. Paul, MN 55113

DEVELOPER

Minnesota Educational Computing Consortium
2520 Broadway Dr.
St. Paul, MN 55113
(612) 638-0600

CONTACT PERSON

Lois Edwards
Courseware Developer
MECC
2520 Broadway Dr.
St. Paul, MN 55113
(612) 638-0640

VOCATIONAL AREA(S)

Automotive Technician Mathematics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

Automotive Technical Mathematics Volume 1 - Arithmetic is a series of interactive programs on two diskettes with an accompanying support manual. It is designed to supplement a course in Basic Mathematics for Automotive Technicians. The programs provide worked example problems, practice exercises, and tests in applying arithmetical concepts to realistic problems from the field of automotive mechanics.

The first diskette covers problems using whole numbers and fractions. The second deals with problems involving decimals and percents. The programs are designed for use by individual students working independently at their own pace. The content of the problems is taken directly from the automotive technical program of

(continued on the following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

study. The students receive a varying set of problems with randomly generated numbers and are provided with individualized help at points of difficulty.

Needed equipment includes an Apple II with 48K, a disk drive and monitor. A printer can be used to create a copy of the test that the student has taken at the computer. The printer is optional.

Student handout pages in this manual are numbered sequentially in the upper right corner and may be duplicated for use with students.

This courseware is a product of MECC Instructional Services.

Using the Programs

The computer programs for the automotive technician program at the vocational-technical level were developed to supplement the material presented by the instructor in the classroom. The mathematics and automotive technical instructors are already teaching and covering the content of these programs. The computer programs extend the scope, depth, and variety of the problems that each student encounters.

These programs are designed to supplement a course based on a text such as *Basic Mathematics for Automotive Technicians* by Len Mrachek with Eldo Schmidt, Breton Publishers (1983 copyright).

To supplement the instructor's presentation on analyzing and solving each problem, the *example* section of the program offers students a step-by-step solution to the problem. Students may choose to go through this sequence to the solution as often as desired. A limited number of different problems of the same type are presented. Help sequences are offered, which branch students into detailed step-by-step assistance on needed skills.

In the *practice* section, a second menu allows students to select one operation or a mixture of skills. Students are presented with a realistic problem situation with numbers randomly chosen to fit the real-world environment of the automotive technician. In this way students can practice the same skill many times without encountering the same problem.

When students are ready to demonstrate mastery of a skill, the *test* may be selected from the menu. Ten problems randomly selected from a bank of about twenty items are presented as a test. The student enters an answer and is told whether it is correct or not, but is not given the correct answer. At the end of the ten test items, the student's score is displayed. A printer attached to the computer can be used to create a printed copy of the test questions, the student responses, the correct answers and the score.

Record sheets included within this manual provide students a place to record the sections practices and the test results. If tests are not printed using a printer, the instructor may wish to have students take the test in a controlled, supervised area in order to determine mastery of the material.

Name of Program CAIVEP, COMPUTER ASSISTED INDIVIDUAL VOCATIONAL EDUCATION PLAN

Make and Model of Computer on Which it is Used Trs-80 Model III

FOR SALE

yes ☐ no ☒

Order from:

DEVELOPER

Pamela A. Richard
Dir. of Voc. Special Services
Somersworth High School
Memorial Dr.
Somersworth, NH 03878
(603) 692-2431

CONTACT PERSON

Pamela A. Richard
Dir. of Voc. Special Services
Somersworth High School
Memorial Dr.
Somersworth, NH 03878
(603) 692-2431

VOCATIONAL AREA(S)

Auto Mechanics
Horticulture
Distributive Education
Building Trades
Commercial Foods
Office Procedures
Residential Wiring
Agricultural Mechanics

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Computer assisted management

PROGRAM DESCRIPTION

This program compares the students' level of functioning to that required for success in a specific course, then prints out recommended modifications, directly usable by the classroom teacher and indicates areas where further testing or information is required. This is geared specifically to the programs at Somersworth High School, but can be modified to meet the needs of another school.

MODIFICATIONS FOR SPECIAL POPULATIONS

Name of Program DRAFTING, ELECTRONICS

Make and Model of Computer on Which it is Used TRS 80

FOR SALE

yes ☐ no ☒

Order from:

See Developer

DEVELOPER

Paul Dorrance
Lee Holmes
Helena High School
1300 Billings Ave.
Helena, MT 59601
(406) 449-8090

CONTACT PERSON

Paul Dorrance
Lee Holmes
Helena High School
1300 Billings Ave.
Helena, MT 59601
(406) 449-8090

VOCATIONAL AREA(S)

Drafting
Electronics

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Individualized Instruction

PROGRAM DESCRIPTION

Computer Assisted Instruction in a Completely Self-Paced, Individualized Program. All of the many materials such as assignment sheets, exams, etc. are stored on discs and are called up and printed when needed.

MODIFICATIONS FOR SPECIAL POPULATIONS

Ed. note this is an example of a self developed CAM.

Name of Program ELECTRONICS I FINAL EXAM REVIEW

Make and Model of Computer on Which it is Used Apple II+

FOR SALE

yes ☐ no ☒

Order from:

Free. Send a disk, we will copy.

DEVELOPER

Michael P. Hansen
Concord Voc. Center
Warren St.
Concord, NH 03301
(603) 228-1741

CONTACT PERSON

Michael P. Hansen
Concord Voc. Center
Warren St.
Concord, NH 03301
(603) 228-1741

VOCATIONAL AREA(S)

Electronics

FOR WHICH STUDENTS

Regular
Slow Learner

PROGRAM FORMAT

Drill and Practice
Problem Solving

PROGRAM DESCRIPTION

Provides practice on the use of formulas introduced during the year. Generates random examples. Uses page 1 of HiRes. Practice on power dissipation, parallel and series inductance, parallel and series capacitance, and reactance.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MACHINE SHOP REVIEW

Make and Model of Computer on Which it is Used Apple II Plus 48K 1 Drive

FOR SALE

yes ☒ no ☐
$29.95

Order from:

Hobar Publications
1234 Tiller Lane
St. Paul, MN 55112

DEVELOPER

Donavan Jones
Clinton Community
School District
P.O. Box 566
Clinton, WI 53525
(608) 676-2223

CONTACT PERSON

Donavan Jones
Clinton Community
School District
P.O. Box 566
Clinton, WI 53525
(608) 676-2223

VOCATIONAL AREA(S)

Metalworking
Machine Shop
General Metals

FOR WHICH STUDENTS

Regular
Disadvantaged
Slow Learner

PROGRAM FORMAT

Testing and Review

PROGRAM DESCRIPTION

For testing and review with student interaction and immediate reinforcement as to correct or incorrect student responses. There are 471 questions in all covering categories: Lathe Parts; Engine Lathe-General; Engine Lathe-Advanced; Lath-Grind-Bore; Drilling; Milling; Grinding; and Heat Treating. There is adequate written documentation sent along with program for both student and instructor.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program MICROCOMPUTER APPLICATIONS IN VOCATIONAL EDUCATION: TRADES AND INDUSTRY

Make and Model of Computer on Which it is Used No. 219A TRS-80 Model III TRS DOS 48K - $8.50; No. 219B Apple II Plus 3.3 DOS 48K - $8.50; No. 219C Pet Basic 3 Commodore 4040 Disk Drive - $4.75; No. 219D Additional Printed Documentation Only - $1.50

FOR SALE

yes ☒ no ☐

Order from:

Curriculum Publications Clearinghouse
Western Illinois Univ.
Horrabin Hall 46
Macomb, IL 61455

DEVELOPER

Wilma Jean Alexander
Illinois State Univ.
Normal, IL 61761

CONTACT PERSON

James Haire
ISBE/DAVTE
100 N. First St.
Springfield, IL 62777
(217) 782-4620

VOCATIONAL AREA(S)

Trades and Industry

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

A series of programs designed to demonstrate the use of the microcomputer in the trades and industry occupational area. Each set includes all of the programs listed below on one or more 5¼" disks plus one printed documentation. The specific programs are the following:

Stairway Design
Heat I
Heat II
Passive Solar Design
Electrical Service Entrance Calculation
Tuned Circuit Analysis Program
Capacitance Calculations Program
Transistor Switching Circuit Design
Speaker Crossover Network Design
Building Construction Budget Estimation

cont. on next page

MODIFICATIONS FOR SPECIAL POPULATIONS

None

MICROCOMPUTER APPLICATIONS IN VOCATIONAL EDUCATION: TRADES AND INDUSTRY
contd.

Lumber Planning Cost Estimate
Board Feet Calculations Program
Speeds and Feeds Program
Spur Gear Design Program
Metric Conversion and Bolt Selection
Equivalent Volume Compliance (VAS) Program
Speaker Enclosure Design
Printing Cost Estimation Package
Automotive Maintenance Program
Framing Materials Estimate Program

Name of Program MILWAUKEE AREA TECHNICAL COLLEGE - COMPUTER ASSISTED DRAFTING

Make and Model of Computer on
Which it is Used Apple II+ or Apple IIe

FOR SALE

yes ☒ no ☐

Order from:
Milwaukee Area
Technical College
1015 No. 6th St.
Milwaukee, WI 53203
(414) 278-6247

DEVELOPER

V. Langer
J. Erbes
MATC
1015 No. 6th St.
Milwaukee, WI 53203
(414) 278-6247

CONTACT PERSON

Robert Kennedy
MATC
1015 No. 6th St.
Milwaukee, WI 53203
(414) 278-6247

VOCATIONAL AREA(S)

Mechanical Drafting
Electrical Drafting
Architectural Drafting
Structural Drafting
Commercial Art Drafting

Suggest: 2nd semester of college or vocational program senior high school with 2 yrs. drafting courses

FOR WHICH STUDENTS

Regular

Pre-req. - semester of college level drafting or high school equivalent or 1 year of drafting experience. Alg. & Geo. with understanding of cartesian and polar coordinate math.

PROGRAM FORMAT

Computer Aided Drafting System

PROGRAM DESCRIPTION

A student manual with reference material, assignments and lab exercises provides framework for competency based instruction system. Student is guided in classroom, completes assignments at home and performs hands-on exercises in microcomputer lab.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program NORPLOT

Make and Model of Computer on Which it is Used TRS-80 III, PET

FOR SALE

yes ☒ no ☐

Order from:

Jerry Sauer
Steve Schumacher
Box 705
Northern State College
Aberdeen, SD 57401

DEVELOPER

Jerry Sauer
Steve Schumacher
Box 705
Northern State College
Aberdeen, SD 57401
(605) 622-2571

CONTACT PERSON

Jerry Sauer
Steve Schumacher
Box 705
Northern State College
Aberdeen, SD 57401
(605) 622-2571

VOCATIONAL AREA(S)

n/a

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged
Slow Learner

Basically everyone can use it

PROGRAM FORMAT

Drill and Practice
Problem Solving

PROGRAM DESCRIPTION

"NORPLOT" is a CAD program developed at NSC for use in a general drafting program. It draws, by use of a graphics platter, any of the geometric shapes. It is programmed so that anyone without a computer background can operate and draw with it.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program OCCUPATIONAL READING INSTRUCTIONAL MODULES PROJECT

Make and Model of Computer on
Which it is Used Apple II 3.2 or 3.3

FOR SALE

yes ☐ no ☒

Order from:

Will share information.

DEVELOPER

Kathy Finnerty
Box 488
Oswego Co. BOCES
Mexico, NY 13114
(315) 963-7251

CONTACT PERSON

Kathy Finnerty
Box 488
Oswego Co. BOCES
Mexico, NY 13114
(315) 963-7251

VOCATIONAL AREA(S)

Auto Mechanics
Cosmetology
Welding
Blueprint Reading
Reading the Ruler
Nursing
Retail Merchandising
Cooking and Baking
Food Service

FOR WHICH STUDENTS

Regular
Handicapped - Used with mentally, learning, emotional and physically disabled students.

PROGRAM FORMAT

Drill and Practice
Tutorial

PROGRAM DESCRIPTION

The purpose of this project was to develop computer assisted instructional (CAI) reading modules for the Cosmetology and Auto Mechanics curriculums. It was the objective of the program to incorporate computerized reading modules comprised of passages synthesized from currently used textbooks into the compensatory vocational reading program. It was also an objective to increase the reading performance of students so that they demonstrate a competency level of 80 percent content mastery as a result of the infusion of CAI reading modules into the occupational reading center. (continued on following pages)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Procedures

Method of Developing Computer Modules in Cosmetology and Auto Mechanics

The project coordinator, Kathy Finnerty, met with George Bell, the auto mechanics instructor, and Kathy Kelsey, the cosmetology instructor to prepare 10 modules based on curriculum content from each of the two areas. Each instructor was asked to select 10 units from his/her curriculum. Arrangement of major units which would lead to mastery and successful completion of the course was the initial step. The agreed upon 10 units were subdivided into sections and the sections were written by content area specialists with help from the reading coordinator. In addition to writing the reading modules, pictures were used for visual reinforcement. The pictures were selected to fit the specifications of each passage. If the pictures were found in printed copyrighted material, permission was secured for their use from the author and/or publisher.

The services of a computer programmer were purchased. The computer programmer wrote a program to fit the specific needs of the project. The program includes: 1) disk menu and 2) a shell program.

The quantity of the material involved in the project required a typist to put the material into the computer. The typist used a format easy enough to be reused by a non programmer.

Color graphics were a high priority of this project. It was felt that the student using the reading modules needed visual reinforcement that color graphics could provide. A graphics tablet was purchased that allowed a non programmer to draw or trace a picture which, when completed, was "saved" on the program disk.

In addition to the programming of the reading modules, the programmer had to devise a method of recordkeeping for each student. This record contained the student's name and his/her score on each section of the modules. At any time the teacher or student would be able to retrieve the information on how a student performed on the sections of each reading module. The programmer developed a package that enabled the instructor to print this information in hard copy, should the need arise. The program allowed for corrections of misspelled words, for changing any information or picture, for inserting a picture or page, for deleting a picture or page, and for changing a reading module or section name.

When the program was completed, the programmer explained to the typist how to use the computer. The typist was then able to type in the material and draw the pictures. The programmer was available throughout the programming and the fiscal year for making revisions and to answer questions as they arose.

The programs are presently being used on two single drive APPLE II plus computers, w/32K RAM and 48K RAM. These programs are written almost entirely in basic computer language. Pictures used in the lessons are created on the APPLE Graphics Tablet. The run-time interpreter takes about 5K RAM. One HI-RES screen is reserved for pictures. About sixty pages of text and questions are available in the 48K machine. Pictures are called off the disk as needed.

Method of Selecting Subjects

Students identified as needing help in reading/math/writing were identified by four methods. They were:

- by recommendations from the home school, n=100
- by means of the TABE (a locator test) to screen students who might be in need of remediation, n=159
- by recommendations from the occupational education instructor, n=63
- by self-referral (student identified himself/herself as needing help in basic skills), n=39

Three hundred sixty-one names were identified as needing some type of assistance from the ORC. This number represented students who may have been referred to the ORC more than once. An unduplicated count resulted in the identification of 198 students who were asked to participate in the programs offered by the ORC.

The following is a listing of how the student responded to the request.

70 students chose not to attend the ORC for any remediation.

37 students chose not to participate in the ORC on a regular basis, but to attend on an as needed basis for help with tests, specific assignments, etc.

24 students attended on a regular basis (at least once a week) for specific help in their vocational area, or to brush up on basic principles in reading/math/writing as they related to their vocational area. These students were not considered remedial cases.

35 students attended on a regular basis (at least once a week) for remedial help in reading/writing/math.

32 students attended on a regular basis (at least once a week) for remedial help in reading/writing/math and worked on the computer assisted instructional modules in cosmetology and auto mechanics. n=198

Population Studied

Of the 128 students enrolled in the Occupational Resource Center, 32 students participated in the dual remediation effort. This dual remediation effort incorporated the CAI reading modules with a traditional remedial approach to the improvement of basic skills for students enrolled in cosmetology or auto mechanics curriculums.

Results

Evaluation Methods Used

Two types of evaluations were conducted. Students were asked a series of questions pertaining to the usefulness of the CAI reading modules in cosmetology and auto mechanics. Scores for those students using the CAI reading modules were recorded for each student, instructor, or reading coordinator to review.

The student evaluation form for the auto mechanics student consisted of four questions. They were:

1. What is your opinion of the modules?
2. How may the modules be used? ___review for test, ___learning information
3. How much help were these modules to you in preparing for exams? ___a great help, ___some help, ___of little help
4. What are your comments or suggestions?

The student evaluation form for the cosmetology students contained eight questions. They were:

1. Have you used the computer modules?
2. About how many hours have you used the computer?
3. What is your opinion of the modules?
4. How have you used the modules? ___review, ___learning information, ___used the book copy in classroom
5. How much help were these modules to you in preparing for cosmetology exams? ___a great help, ___some help, ___of little help
6. Did you have any trouble in operating the computers? If you had any trouble, explain:
7. Please check the modules you worked on: (a listing of the 10 modules was supplied)
8. Have you any comments or suggestions?

The project was considered a huge success. The student response to the modules was overwhelming. Students unanimously requested more modules and more time on the computer. This has proved to be an excellent vehicle for providing instruction in basic skills to students motivated to read in an area of particular interest to them.

Result of Using the Modules for Success in the Vocational Program

The primary reason for developing the CAI modules was to provide the student with another method of learning in the vocational curriculum and to help the student improve his/her basic skills. It was determined that successful completion of the program would be the criteria for judging the success of modules.

The following represents the failure rate of students who participated in, or were asked to participate in, the programs offered by the ORC.

60% of the students who refused to take any type of remediation (n=70) failed the BOCES vocational course in which (s)he was enrolled,

3% of the total student population of Oswego BOCES (n=1274) failed vocational courses,

6% of the remedial students who attended on a regular basis (n=91) failed the BOCES vocational course in which s(he) was enrolled, and

6% of the remedial students who attended on a regular basis and were enrolled in either cosmetology or auto mechanics (n=32) failed the BOCES vocational course in which (s)he was enrolled.

Products

At the beginning, the modules were used on a trial basis to determine if corrections were needed. The need to expand each section of the reading modules was identified. It was determined that a list of vocabulary words, which each student would need to comprehend each section, should be included. The vocabulary list led to the development of a glossary of terms. It was also determined that other reinforcing activities and worksheets should be included with the reading module sections.

Each of the vocabulary words was recorded on the Language Master for student use. A Language Master has a visual screen that displays words in list form. A cassette tape of each section of the reading modules was also recorded by the reading coordinator. In this way, both the visual and/or auditory learner had an appropriate method for improving word identification and vocabulary development. One of the students using the computer was a non-reader and this method enabled him to successfully use the reading modules with the aid of the auditory tapes and a set of earphones.

Another instructional aid was a large revolving bulletin board. Engine parts were wired on to the board, along with the name of each part and its function in the engine. A cross section of an engine, with movable parts, was available beside the computer for those students in the small engine component. Displays were developed for the cosmetology students. Materials for experiments were available, i.e. litmus paper to test the ph of hair products, and powdered castile soap and borax to test if a water sample was soft or hard.

The final product consists of 10 reading modules in each of two vocational areas - cosmetology and auto mechanics repair. Each module is broken into smaller sections. Each section within the reading module contains a list of vocabulary words needed for maximum comprehension of the passage, a glossary of these words, related passages, and graphics followed by questions to check student comprehension. If the student answers a question incorrectly, the paragraph or sentence in which the answer appears, will appear on the screen. The student is asked to reread the paragraph(s) or sentence(s) and reanswer the question. Several worksheets for students' use for review, and for additional reinforcement are also incorporated in the modules.

Vocabulary mastery is achieved through the use of the Language Master, bulletin board with engine parts, bulletin board for cosmetology, and through continued review and reinforcement.

Conclusions and Recommendations

The auto mechanics and cosmetology modules were intended and written for remedial students in two classes at Oswego County BOCES, the auto mechanics class and the cosmetology class. Although the modules were designed specifically for remedial students in these two areas, their educational utility went far beyond their original purpose.

The cosmetology and auto mechanics instructions soon discovered the modules could be of benefit to a wide range of students. They served as a review for some advanced students as well as a way to bring students up-to-date when students had missed important lecture information. When a student, missed a class lecture, the instructor could simply assign him/her to the appropriate computer module. This saved instructor energy and an enormous amount of class time; time previously devoted to presenting missed lessons could be spent in further developing lesson concepts or meeting other individual student needs.

The auto mechanics modules were used by the auto service, small engines, auto engine and auto repair classes. The instructors in these five classes felt the explanations offered by the modules concerning basic engine operating principles were transferable to their areas.

In the summer of 1982, the CETA adult automotive classes used the modules as recommended by the BOCES auto engine instructor. The CETA students, particularly have expressed great enthusiasm for the concise, well-defined explanations of difficult principles. Many of the CETA students commented that the color graphics of engine parts shown in relation to other engine parts helped them get a better understanding of the engine as a whole operating unit. One CETA student commented that the modules were a much better teaching tool than any of the textbooks or manuals they were using in class. He said, "The modules explained things well" and got to the "heart of the matter in a short, sweet and simple way."

The BOCES electronics instructor, in 1981 taught a one-week mini course to his students on the electrical system in an automobile, specifically the ignition system. The first day of the mini course, he presented on a wide screen monitor, module four, "The Electrical System and Ignition System." He used the module with his entire class in a lecture-type setting. He reviewed and discussed each vocabulary term, read aloud and discussed in greater depth each page of the text and had the students answer the comprehension questions together, and then discussed the answers. He felt it was a superior way to introduce the basic concepts which he would have to spend the rest of the week explaining to his electronics students.

Incorporated within the modules is a section of cloze passage exercises. The questions emphasize the use of surrounding context clues to find the meaning of an unknown word. The cloze format, adopted by the New York State Education Department for its use in the Regents Competency Exams, has been a beneficial device in teaching students a useful reading tool. The exercises have helped prepare the BOCES high school students for the R C T. They have also been used to teach strategies that the student could apply when reading homework assignments in areas such as math, social studies, or science.

The cosmetology modules, too, have seen a variety of uses. Originally intended for use with first year cosmetology students, the second year students found the modules a great help in preparing for the State Board Exam in cosmetology. They used the modules as a type of refresher course, to review, and to brush up on vocabulary and concepts.

The bacteriology module from the cosmetology modules was used by a variety of BOCES classes. Cooking and baking teachers used it to introduce a unit on harmful bacteria present in food. They used the section of the module that explained what bacteria was, the types of bacteria, and the harmful effects of bacteria. They also found the sections on sanitizing and sterilization applicable to their discussion of the need for cleanliness in the kitchen. The cooking and baking instructor chose to use the modules in their hard copy form and not use the computer. He used the computer printout of the module and duplicated the sections for each class member. He introduced the vocabulary to the whole class, then gave the printed module as a silent reading activity. The students read the sections and answered the questions. Students scoring poorly on the module comprehension pretest, were referred to ORC where they reviewed the vocabulary and worked on the same text, but this time using the computer as the delivery method.

The nursing and dental instructors referred specific students to use the cosmetology modules. Their students used the bacteriology module and the skin and scalp module.

One member of the guidance counseling staff asked to use the modules to help any undecided students better choose their BOCES classes for the next year. One case in point was a tenth grader who very much thought she wanted to be a hairdresser. The guidance counselor felt this student had an unrealistic view of the profession and the amount of studying, etc. needed before entering the field. An hour viewing the modules and looking at the State Board Exam, helped give a potential cosmetology student a more realistic view of, and better explanation of, the coursework that would be expected of her, should she choose to enter that course of study.

OCCUPATIONAL READING INSTRUCTIONAL MODULES PROJECT (contd.)

The modules also have proved to be quite a computer attraction for members of the staff at Oswego County BOCES. Since their presentation at a faculty meeting in January 1981, there has been great interest in the use of a computer as a teaching tool. It has also been possible, through the help of the other instructors, to program mini modules and worksheet exercises in the areas of rough carpentry, finish carpentry, cooking, baking, criminal justice, welding and nursing.

The work load in creating the modules from a programming and writing standpoint has been enormous. The writing of 10 modules, although very worthwhile, was a monumental undertaking. Many manhours have gone into the creation of these modules, and countless more in the revisions done throughout the year. (A suggestion would be to write much smaller sections rather than an entire curriculum.)

The hardest part, however, is completed. We have an excellent working program and format which allows any information to be typed into the computer, accompanied by color graphics to create a specific desired module. The technology, hardware, and working knowledge of such a project are now in place.

The benefits are great and wide spread. The potential for programming modules is restricted only by the imaginations of the people involved. It is possible to program everything from how to read a welding blueprint, to the steps involved in framing a house, to the teaching of data processing and programming a computer, etc. The possibilities are endless!

The limitations are only in the time, energy and money required to create and program modules.

Project staff members received permission to utilize definitions and illustrations from Milady Publishing Corporations' Standard Textbook of Cosmetology; John Deere Incorporation Materials and selected items from the Key Word Glossaries developed by Oakland Schools, Pontiac, Michigan. Samples of some of the materials produced by project staff members follow.

Digestion Review & Quiz

PAGE 1

LET'S REVIEW SOME MAJOR CONCEPTS CONNECTED WITH THE DIGESTIVE SYSTEM....

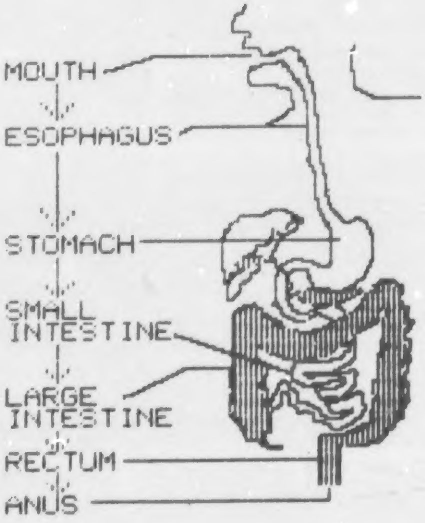
- THE PROCESS OF BREAKING DOWN FOOD TO NUTRIENTS THE BODY CAN USE IS CALLED DIGESTION.
- FOOD MUST UNDERGO BOTH PHYSICAL AND CHEMICAL CHANGES BEFORE IT CAN BE USED BY THE BODY CELLS.
- GLANDS IN THE DIGESTIVE SYSTEM PRODUCE THE ENZYME JUICES NEEDED TO CHANGE THE FOOD INTO SIMPLER FORMS OF CHEMICALS WHICH THE BODY CELLS CAN USE.

* * *

PAGE 2
FIGURE 1

DIGESTIVE SYSTEM

THIS IS THE PATH THAT FOOD TRAVELS THROUGH THE BODY.


MOUTH
ESOPHAGUS
STOMACH
SMALL INTESTINE
LARGE INTESTINE
RECTUM
ANUS

PAGE 3

* ENZYMES FOUND IN DIGESTIVE JUICES, ACT ON FOOD TO BREAK-DOWN COMPLEX MOLECULES INTO DIGESTED NUTRIENTS THE BODY CELLS CAN USE.

LISTED ON THE NEXT THREE PAGES ARE A SUMMARY LIST OF DIGESTIVE JUICES AND THE FUNCTION EACH PERFORM.

****

PAGE 4
FIGURE 2

SOURCE	JUICE	ACTION
Mouth - Salivary glands	Saliva	Changes some starch (maltose). "Digestion begins" ENZYME - Ptyalin
Esophagus	None	None
Stomach - glands in the lining of the stomach	Gastric	ENZYMES Repin - changes milk proteins to curds. Pepsin and hydrcchloric acid - partially digests proteins. Lipase - changes fats to fatty acids.
Liver - gall bladder into duodenum	Bile	Changes large fat droplets to small droplets.

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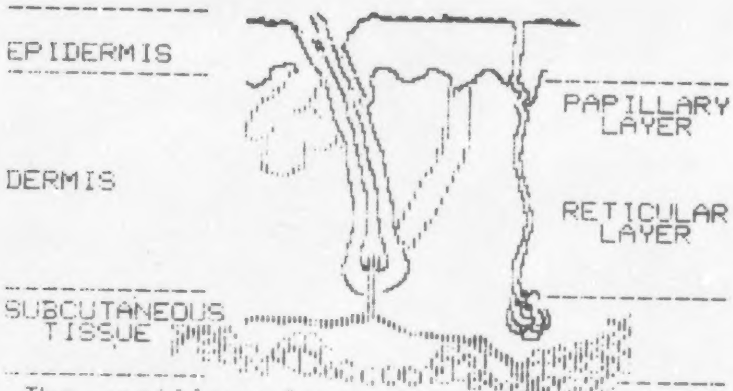
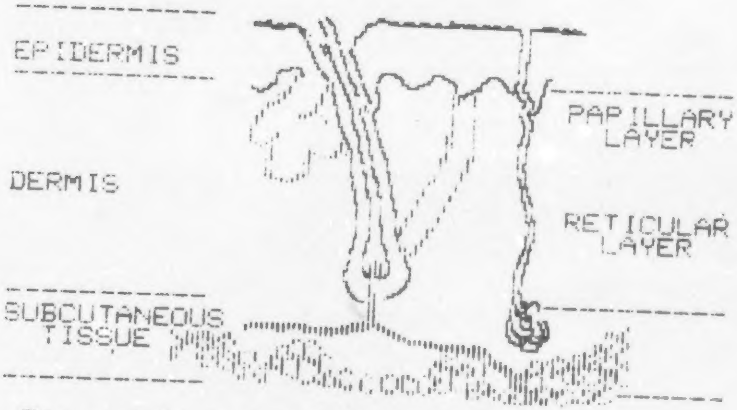
PAGE 17
FIGURE 7


EPIDERMIS
DERMIS
SUBCUTANEOUS TISSUE
PAPILLARY LAYER
RETICULAR LAYER

The papillary layer lies right under the epidermis. It contains capillaries and nerve fiber endings called tactile corpuscles. Melanin (skin coloring) is also in this layer.

* * *

PAGE 18
FIGURE 8


EPIDERMIS
DERMIS
SUBCUTANEOUS TISSUE
PAPILLARY LAYER
RETICULAR LAYER

The reticular layer contains some fat cells, blood vessels, oil glands, sweat glands, hair follicles, and the arrector pili muscles.

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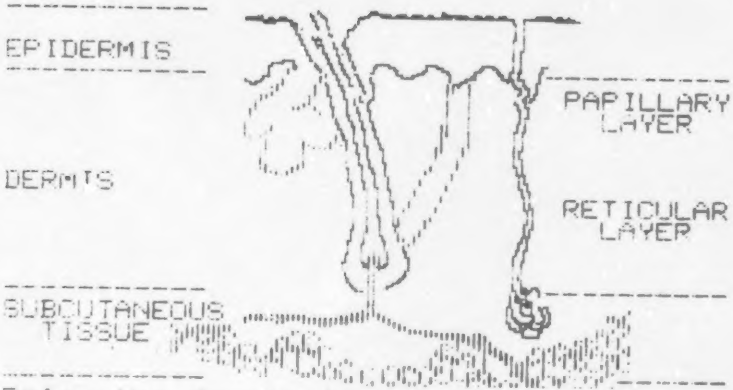
PAGE 19
FIGURE 9


EPIDERMIS
DERMIS
SUBCUTANEOUS TISSUE
PAPILLARY LAYER
RETICULAR LAYER

Below the dermis is a layer of subcutaneous tissue (adipose or subcutis). This fatty tissue layer contains fats used by the body as energy. This layer varies in thickness.

****

PAGE 20

1. THE TWO LAYERS OF SKIN ARE THE

-----.

A. DERMIS AND EPIDERMIS

B. DERMA AND CORIUM

C. CUTIS AND DERMIS

D. CUTICLE AND DERMIS

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2. WHICH OF THE FOLLOWING WORDS IS NOT ANOTHER NAME FOR THE DERMIS LAYER OF SKIN? ---

   A. DERMA
   B. CUTICLE
   C. CORIUM
   D. CUTIS

****

3. THE LAYER OF EPIDERMIS VISIBLE TO THE EYE IS THE -----.

   A. STRATUM CORNEUM
   B. STRATUM LUCIDUM
   C. STRATUM GRANULOSUM
   D. STRATUM GERMINATIVUM

PAGE 23

4. MELANIN IS FOUND IN THE -----
LAYER OF THE EPIDERMIS.

A. STRATUM CORNEUM
B. STRATUM LUCIDUM
C. STRATUM GRANULOSUM
D. STRATUM GERMINATIVUM

****

PAGE 23

5. THE CLEAR LAYER COMPOSED OF
TRANSPARENT CELLS IS THE -----.

A. STRATUM CORNEUM
B. STRATUM LUCIDUM
C. STRATUM GRANULOSUM
D. STRATUM GERMINATIVUM

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PAGE 5

THE SECOND OPENING LETS BURNED FUEL OR EXHAUSTED GASES OUT OF THE CYLINDER. THIS VALVE IS CALLED THE EXHAUST VALVE.

THE INTAKE AND EXHAUST VALVES MUST OPEN AND CLOSE AT THE RIGHT TIME FOR THE ENGINE TO RUN.

* * *

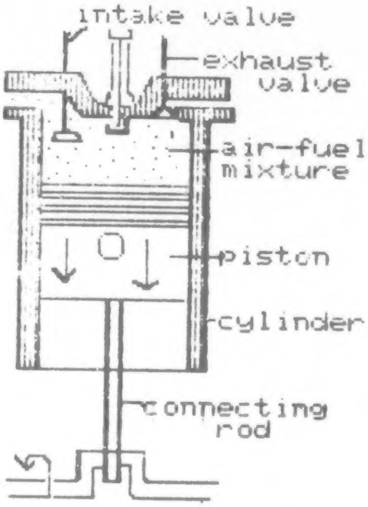
PAGE 6
FIGURE 1

INTAKE

VALVE POSITIONS:

* Intake - open
* Exhaust - closed

On the intake stroke, the piston is traveling down (from TDC to BDC) inducting the air fuel mixture into the cylinder.


intake valve
exhaust valve
air-fuel mixture
piston
cylinder
connecting rod

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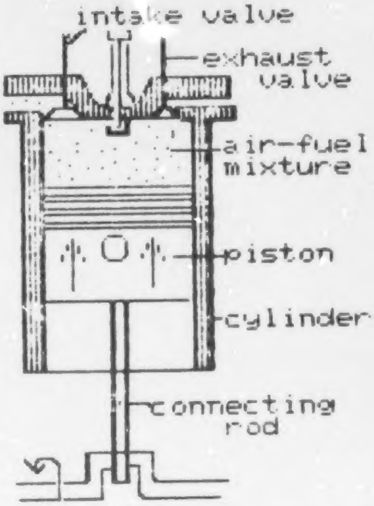
PAGE 7
[illegible]GURE 2

COMPRESSION

VALVE POSITIONS:

- Intake - closed
- Exhaust - closed

On the compression stroke, the piston moves up, BDC to TDC, and squeezes the air-fuel mixture.


intake valve
exhaust valve
air-fuel mixture
piston
cylinder
connecting rod

* * *

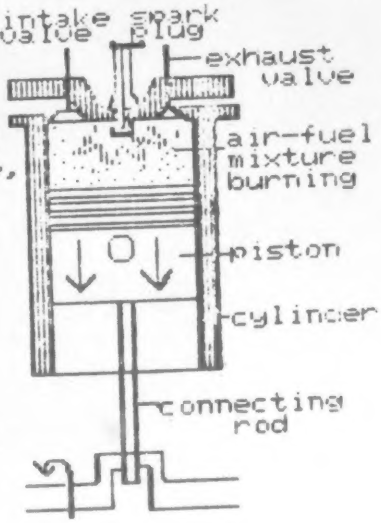
PAGE 8
FIGURE 3

POWER

VALVE POSITIONS:

- Intake - closed
- Exhaust - closed

On the power stroke, the air-fuel mix is ignited by the spark plug. The violent burning causes the gas to expand pushing the piston down which creates POWER.


intake valve
spark plug
exhaust valve
air-fuel mixture burning
piston
cylinder
connecting rod

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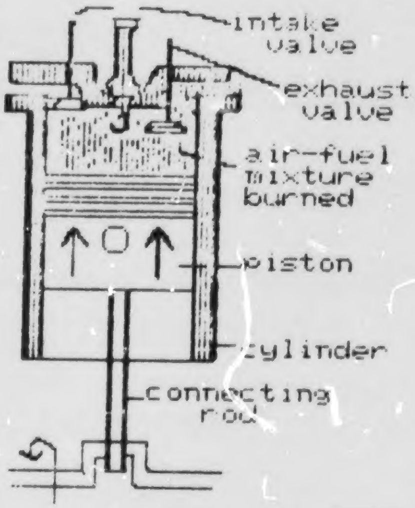
PAGE 9
FRAME 4

EXHAUST

VALVE POSITIONS:

Intake - closed
Exhaust - open

On the exhaust stroke, the piston moves up and pushes out the burned gases through the open exhaust valve.


intake valve
exhaust valve
3
air-fuel mixture burned
piston
cylinder
connecting rod

* * *

PAGE 10

1. THE PART OF THE ENGINE THAT OPENS OR CLOSES THE OPENINGS IN THE CYLINDER IS THE -----.

   A. PISTON

   B. CYLINDER

   C. CRANKSHAFT

   D. VALVE

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2. WHEN THE INTAKE VALVES ARE OPEN AND THE EXHAUST VALVES ARE CLOSED, THE PISTON SHOULD BE MOVING DOWN ON THE --- STROKE.

   A. INTAKE
   B. COMPRESSION
   C. POWER
   D. EXHAUST

3. WHEN THE EXHAUST VALVE IS OPEN AND THE INTAKE VALVE IS CLOSED THE PISTON SHOULD BE MOVING ON THE --- STROKE.

   A. INTAKE
   B. COMPRESSION
   C. POWER
   D. EXHAUST

****

4. WHEN BOTH VALVES ARE CLOSED AND THE PISTON IS MOVING DOWN IT IS ON THE -- STROKE.

   A. INTAKE
   B. COMPRESSION
   C. POWER
   D. EXHAUST

5. WHEN BOTH VALVES ARE CLOSED AND THE PISTON IS MOVING UP IT IS ON THE --- STROKE.

   A. INTAKE
   B. COMPRESSION
   C. POWER
   D. EXHAUST

Name of Program QUICK SCORE

Make and Model of Computer on Which it is Used Apple II Microcomputer Chatsworth 500 or Mountain 1100A Card Reader

FOR SALE

yes ☒ no ☐

Order from:

Dr. Page Crouch
203 Freeman Hall
Clemson Univ.
Clemson, SC 29631
(803) 656-3455

DEVELOPER

Clemson Univ.
Industrial Education Div.
203 Freeman Hall
Clemson Univ.
Clemson, SC 29631
(803) 656-3455

CONTACT PERSON

Dr. Page Crouch
203 Freeman Hall
Clemson Univ.
Clemson, SC 29631
(803) 656-3455

VOCATIONAL AREA(S)

Presently being developed in graphics - suitable to all vocational T and I programs.

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Curriculum Development and Evaluation

PROGRAM DESCRIPTION

QUICK SCORE is a computer program used with an optical scan card reader for evaluating and reporting test results. In addition to its scoring routine, the program includes a collection of options for creating and editing class rolls, evaluating a card reader's performance, altering the printer linelength, and preparing disks to store class names and I.D.'s.

QUICK SCORE was developed at Clemson University in cooperation with the PICA (Printing Industries of the Carolinas) Foundation. The program runs presently on an Apple II Plus microcomputer equipped with either a Chatsworth 500 or Mountain 1100A card reader. A printer and single disk drive are also required.

(continued on following page)

MODIFICATIONS FOR SPECIAL POPULATIONS

None

QUICK SCORE (contd.)

How are results reported?

QUICK SCORE reports testing outcome to both teacher and student. Each student receives an individual message relaying the class average, the student's rank and grade on the exam, and the correct answers to any missed questions.

The teacher receives the report listing all student grades and ranks, and the class average. The teacher's report also includes an item analysis showing how students in the upper and lower twentieth percentiles fared on the test.

Students missing the exam are reported absent on the teacher's report.

Designing tests with QUICK SCORE.

True/false, matching, and multiple choice questions are well-suited to mechanical scoring. Questions having more than one answer can also be used because QUICK SCORE tolerates multiple marks on questions specified this way on the answer key.

Tests can include essay and short answer type questions, too. For although QUICK SCORE does not evaluate written answers, it will allow a teacher to enter points a student earns on such questions into its scoring routine.

How QUICK SCORE helps.

QUICK SCORE helps teachers by freeing them from the routine and repetitive task of grading objective test items, and calculating individual grades, class averages, and ranks.

QUICK SCORE is fast. It can score a 50 item test taken by 30 students in less than 5 minutes.

The item analysis portion of the teacher's report helps a teacher quickly identify trouble spots, and strengthen and develop test questions.

Since the students' reports include the correct answers to any missed items, time spent "going over" the test can be minimized.

Name of Program RENT/OWN

Make and Model of Computer on Which it is Used TRS 80 III and Apple

FOR SALE

yes ☒ no ☐

$20.00

Order from:

Mildred Luckhardt
Route 1
Commerce, TX 75428
(214) 886-5451

DEVELOPER

East Texas State
Home Economics
Route 1
Commerce, TX 75428
(214) 886-5451

CONTACT PERSON

Mildred Luckhardt
Route 1
Commerce, TX 75428
(214) 886-5451

VOCATIONAL AREA(S)

College level introductory housing

FOR WHICH STUDENTS

Regular

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

The program ask for 23 variables in the rent/own process which deals with financial costs. The program will calculate the various costs from the data and present the rental and the net as well as total costs of owning. Since much of the data must be presumed, the risk factor of deciding one way or the other becomes part of the learning. Evaluation of the analysis and objective questions can demonstrate that students become aware of the undecisiveness of home owning vs. renting. This program does not stand alone. Good in class instruction is needed to develop the data for input. Then analysis of data must take place.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

Name of Program TRANSISTOR BIASING LESSON

Make and Model of Computer on Which it is Used TRS 80 - Level II Language - Models I or III - 16K

FOR SALE

yes ☒ no ☐

Order from:

Jere Wheatley
Rm. 114 Cheevor Hall
Montana State University
Boseman, MT 59717
(406) 994-3201

DEVELOPER

Jere Wheatley
Rm. 114 Cheevor Hall
Montana State Univ.
Boseman, MT 59717

CONTACT PERSON

Jere Wheatley
Rm. 114 Cheevor Hall
Montana State Univ.
Boseman, MT 59717

VOCATIONAL AREA(S)

Electronics

FOR WHICH STUDENTS

Regular
Handicapped
Disadvantaged

PROGRAM FORMAT

Tutorial

PROGRAM DESCRIPTION

Introduced during the IA 335 course. Used as supplemental to text and lecture. Followup includes lab activities biasing both NPN and PNP transistors.

MODIFICATIONS FOR SPECIAL POPULATIONS

None

PART TWO

Integrating the Microcomputer into the Educational System

Braille Entry and Editing System

The following information on the Braille Entry and Editing System was provided by Robert Stepp, Station A, Box 5002, Champaign, Illinois 61820.

Dear Interested Person:

Please excuse this impersonal reply. I have received a great many requests for information about my work on a transcriber work-station.

There are two distinct aspects to the project: (1) software that turns the APPLE II computer into a braille entry and editing station, and (2) a braille output device which receives edited braille copy electronically from the APPLE computer and embosses it on paper. The state of each is quite different, so a section will be devoted to each, separately.

SOFTWARE:

At the present time, I am making braille entry and editing software for the APPLE computer available for $100. The software package consists of two identical diskettes (one as a "backup") and a printed manual which includes a section on tips for transcribers written by Bettye Krolick, a well-known music braillist. The software can run on any of the following APPLE II computer configurations:

APPLE II with 64K memory, one disk
APPLE II with 48K memory, APPLESOFT rom card, one disk
APPLE II Plus with 48K memory, one disk
APPLE II Plus with 64K memory, one disk
APPLE IIe with one disk

Those systems that have "64K memory" capacity consist of the 48K memory APPLE computer with an added "16K" or "language" card. Any configuration can be augmentedby additional disk drive units. Two disks are nice if available. The APPLE IIe can have the 80-column option, though the 80-column display and extra memory (e.g., 128K on the IIe) are not used by the braille editing software. For the APPLE II Plus, the extra 16K memory option (via the so called language card) does expand the capabilities of the APPLE II Plus with 64K memory. The larger maximum file size is a convenience, not a significant limitation. Given 120 pages of braille text, it would have to be handled as six files of 20 pages each on the small-memory systems or as three files of 40 pages each on the large-memory systems.

The braille text is handled internally in the code of the Triformation LED-120 and the Telesensory Versabraille device (both are the same). Additional capability permits the output to be translated to the code used by the Sagem braille printer and the SNIPAS--coded model of the LED-120. All of these devices may be attached to an APPLE computer via a "serial interface" card which plugs into the insides of the computer. Two interface cards which are recommended are the "Super Serial Card" by APPLE and the "7710A" card by California Computer Systems. The system can also type print-braille cells on a Qume printer.

The braille entry and editing system has a brailler keyboard composed of the six typewriter keys SDF JKL (an alternative key sequence may be selected, it is DFG JKL, and is provided because some APPLE II Plus keyboards will not function adequately using SDF JKL--the keyboards were not designed with brailling in mind).

The display screen shows both alphabetic text and braille text. All user-brailled data shows as braille. System messages and diskette catalog listings show as alphabetic text. The screen is arranged as 24 lines of 40 cells each (this is set by the APPLE hardware). Up to 23 lines of braille can be on the screen at a time. It is easy to view lines 1 to 22 on a page of braille and then view lines 4 to 25. Even though the entire page cannot be seen at once, all lines can be seen in the context of many adjacent lines.

The following commands are provided.

A: Append text on the end of an existing line of braille
B: repeat a line of commands ("Back to the beginning again")
C: Center a line and optionally add a page number
D: Delete a line of braille
E: End editing session
F: Find lines containing certain braille words
G: select for editing a Group of scattered lines
H: display Help information about using the editor
I: Insert new lines of braille
J: Join two or more lines into one line
K: Keep the same working (current) line
L: go Lower in the file of braille text
M: Modify the text on a single line
N: show/hide line Numbers
O: send Output to a diskette file or attached device (e.g., embosser)
P: Print braille text on the screen
Q: ask a Question (answered yes or no) before making each change
R: Read in braille text from diskette file or attached device
S: Substitute a braille phrase/word by another
T: define Tab locations
U: go Upward in the file of braille text
V: eliminate Visual feedback--causes commands to work "silently"
W: define vertical Window in the text
X: attach the "X" marker to a line; makes it easy to access the line again
Y: attach the "Y" marker to a line; etc.
Z: attach the "Z" marker to a line; etc.

Additional commands include DOS 3.3 file commands (DELETE, RENAME, VERIFY, CATALOG) plus the command GET which loads an existing braille text file for editing. The editing system includes the feature of multiple-catalog searching for diskette files: on a two-disk-drive system a request such as GET FILEX can be non-specific as to disk drive location and the system will automatically look on both drives (if necessary) to find the file. This facility extends to more than two disk drives, as necessary.

The editing system uses ordinary APPLE DOS 3.3 text files to hold the braille text. The files can be created or processed by other programs that can run on the APPLE system under DOS 3.3. The braille cells are written to the file as one standard ASCII character per cell, according to the Triformation LED-120 code.

BRAILLE OUTPUT DEVICE

A complete braille work station needs an output device to produce high quality braille. A successful braille terminal has been developed under the direction of Dr. Tim Cranmer, formerly head of technical research for the Kentucky Bureau for the blind. The "Cranmer Modified Perkins Brailler" is now marketed through Maryland Computer Services, Inc. The terminal is designed for both input and output of electronic braille text. It works just fine in an "output only" capacity and it is compatible with the braille editing system of the APPLE Computer. The "Cranmer Modified Perkins Brailler" sells for $2750. The braille embosser (based on the Perkins brailler) requires manual insertion of each sheet of paper. It then handles the embossing and paper advance functions automatically until the sheet is completed. The unit runs at about 10 cells per second, or about 30 pages per hour with prompt paper replacement by the operator. In contrast, the Triformation LED-120 runs at 120 cells per second, or about 300 pages per hour. The cost of the Triformation LED-120 is in the $14,000 to $17,000 range.

For further information, contact the following people:

for software (braille entry and editing system):
Robert Stepp (217) 359-7933
Station A Box 5002
Champaign, IL 61820

for electronic Perkins brailler:
Jack Gilson (404) 478-3481
Maryland Computer Services, Inc.
9385 Windy Court
Jonesboro, GA 30236

I hope this information will be helpful.

Very truly yours,

Robert Stepp

Reprinted with the permission of Robert Stepp, Station A, Box 5002, Champaign, IL 21050.

Computer Assisted Instruction Utilized by the Vocational Resource Room at the Somersworth Vocational Center

Pamela A. Richard, Director of Vocational Special Services at Somersworth High School, Somersorth, New Hampshire successfully utilizes microcomputers to motivate students to practice skills required for success in the vocational programs. Vocational programs offered at Somersworth High School include Auto Mechanics, Horticulture, Distributive Education, Building Trades, Commercial Foods, Office Procedures, Residential Wiring and Agricultural Mechanics. The programs are run on TRS-80 Model III computers. The high school is located at Memorial Drive, Somersorth, New Hampshire 03878.

The programs Ms. Richards uses are listed below along with comments about each program.

Math Programs

Galaxy Math Facts: Random House, High School Division, 2970 Brandywine Road, Suite 206, Atlanta, GA 30341
Very basic math facts (addition, subtraction, multiplication and division) on six difficulty levels. Game format. Very popular with students. Encourages improving response speed.

Read and Solve Math Problems: Educational Activities, Inc., P.O. Box 392, Freeport, NY 11520 (800) 645-3739.
A series of ten lessons in solving word problems. Begins with identifying key words to determine which operation to perform, works up to setting up and solving equations. Good for students who have difficulty breaking down word problems.

Multiplication and Division of Whole Numbers, Addition and Subtraction of Whole Numbers: Educational Activities, Inc.
Great interaction with the student - requests name at the beginning of the program and uses it throughout. Rewards correct answer, indicates area of problem with incorrect answer. Good graphics. Student works the problem on paper, types answer on computer. Easy or hard level selected by student.

Addition, Subtraction, Multiplication and Division Tables: Educational Activities, Inc.
Very simple review of basic facts. Student selects type of operation and the number he/she wishes to review. If the wrong answer is given, the problem and answer is flashed repeatedly.

Rounding Off: Educational Activities, Inc.
Practice in rounding off a given number to a specified place. Good for reinforcement of the concept.

Addition and Subtraction of Fractions, Multiplication and Division of Fractions: Educational Activities, Inc.
Two programs. Good for practice in working with fractions, but it involves quite a bit of reading. Student must be able to identify numerator and denominator. Student must also pay close attention to answering the specific

question the computer is asking. There is a tendency to try to skip ahead once the basic ideas have caught on, but that doesn't work.

Changemaker: Educational Activities, Inc.
Student is given the amount of a purchase and the amount the customer hands them, must indicate the correct change. Great to use with "play" money for beginners.

Money Set - Counting Coins, Checkout, Shopping Trip: Mercer Systems, Inc.
Counting Coins is extremely low level, encourages counting aloud. Shopping Trip involves indicating bills and coins to make a purchase, uses a game format. Checkout is making change. Great graphics in all of them. Good to use with any one student for a while, then becomes repetitious.

Addition, Subtraction, Multiplication and Division of Decimals: Educational Activities, Inc.
Good for practice/reinforcement of the operations. Student given problems, works it on paper and types in answer. Three tries, then correct answer is given.

Spelling Programs

Spelling Builder: Program Design, Inc., 11 Idar Court, Greenwich, CT 06830 (203) 661-8799
A series of seven lessons and a 320 word spelling test. Lessons are on: syllabication, doubling final consonant, final "e" with suffixes, suffixes on words ending with "y", tricky plurals, "ie" or "ei", troublesome suffixes. Lots of reading is involved when using this program. The test involves typing in words dictated from a cassette tape.

Flash Spelling: Educational Activities, Inc.
A word is flashed on the screen, the student is then asked to spell that word. Three chances are given, then the correct spelling is presented. At the end of the lesson, words which were incorrectly spelled are listed. Words on the tape are simple, but directions are given for making a copy of the tape with your own words.

Scrambled Spelling: Educational Activities, Inc.
Set up in a game format for two players. A word from the list is presented in scrambled form, the student types in the unscrambled, correct spelling. The computer keeps score for the two players. Points are given for speed. You can make copies with words of your choosing.

Typing Programs

Typing Teacher: Instant Software, 80 Pine St., Petersborough, NH 03458 (603) 924-7296
Good for beginning typists. Good graphics for demonstrating correct finger placement.

Typing Tutor: Microsoft Consumer Products, 400 108th Ave., Bellevue, WA 98004 (206) 454-1315
very popular, great for students who need practice but are bored with typing drills. Adjusts to students level of ability, gives words per minute and accuracy after each lesson. Great for setting goals, seeing improvement.

Miscellaneous Programs

Kingdom: Educational Activities, Inc.
A decision making game. The player is the ruler of a country, and must make decisions about crops to keep the subjects alive. Lots of reading.

Memory Builder: Program Design, Inc.
Set up as a game of concentration - student must remember where matching letters or words are located, out of 20 possibilities. Can play against the computer, self, or another player. Students love it. Can be used as a reward and to discuss what method the student uses to remember - hopefully, to apply this technique to other memorization work.

Readability: Educational Activities, Inc.
The user types in three paragraphs from a book, the computer does the analysis and gives a grade level. Saves lots of time!

Books

Speelhoffer, Thomas. Basically Speaking. J. Weston Walch, Portland, Maine 04104. Reading level is below sixth grade. Used for learning disabled and other handicapped students who are learning to program. This publication is in a workbook format.

Reprinted with the permission of Pamela A. Richard, Director of Vocational Special Services, Somersworth High School, Memorial Drive, Somersworth, New Hampshire 03878.

COMPUTER MANAGED EDUCATION AT FOX VALLEY TECHNICAL INSTITUTE

by the Staff of Fox Valley Technical Institute
in collaboration with the IBM Corporation

Computer Applications

Serving some 5,000 full- and 34,000 part-time students in technical, vocational, and continuing education programs, the Fox Valley Technical Institute in Appleton, Wisconsin, is set on a 140-acre campus with eight multi-purpose classroom and laboratory buildings. Four subcampuses are located in Wautoma, Clintonville, Chilton, and Oshkosh. Classes are also conducted in 26 high schools and other buildings in the five counties served by the Institute.

Fox Valley has an annual operating budget of $9 million, more than 800 full time and ad hoc faculty members, and more than 600 courses in 95 occupational fields. Its education goals are to help local citizens develop their abilities primarily for employment opportunities, but also to enrich avocations. The Institute approaches its educational goals through reliance on competency-based education.

Technical programs are designed to train students for careers in areas such as data processing, mechanical design, and electronics. Associate degrees are awarded for those completing the two-year programs as offered in twenty-four technical areas. Vocational courses train people for such skilled occupations as: auto mechanic, baker, truck driver, and machine tool operator. Apprenticeship programs enable students to combine classroom learning with on-the-job training in such fields as plumbing, carpentry, meat cutting, welding, and electronics.

Fox Valley serves the community through such specialized educational programs as safety and public service training for volunteer firemen, general and vocational training for new Americans, literacy and language courses for adults, farm training classes, and courses to meet the needs of senior citizens.

As a measure of its success in training people for useful employment, more than 94% of those students successfully completing their programs are placed in jobs, according to school records. Even with its broad range of courses and students, Fox Valley maintains one of the lowest per-student educational cost rates among similar schools in the 16 tax base supported districts in Wisconsin. This is due in part to innovative approaches to the learning process. Much of the instruction is conducted in conventional lecture format. In addition, individualized instruction, computer-assisted instruction, "hands-on" time in shops and labs, audiovisual techniques, and closed-circuit VT tutorial labs provide other methods of learning.

Another reason for efficiency is the non-traditional format of many programs. Within the general two-semester calendar, courses do not have to adhere to a set schedule. Students are allowed to begin some courses as soon as a classroom position is available, and to complete the course as soon as the required proficiency is reached. In many situations, students complete courses in less time than scheduled. This means that additional students can be accepted during the semesters to keep facilities in full use.

Competency-based education is the operating guide at Fox Valley. In carrying this out, school faculty and administration have relied to a remarkable degree on computer-oriented techniques. More than 1,500 students take courses where part of the learning, or the management of their learning activities takes place at computer terminals. Students find out about their individual learning styles through a computer-scored and computer-interpreted testing process. Students also find Fox Valley courses are easier to enter and complete, and programs are more easily reviewed and changed because of an online student information and advisement system.

Instruction, Drill, and Testing

In the Fox Valley library, a student reports to the monitor for her computer terminal reservation. On the hour, she takes a seat at one of 14 interactive display stations. Matter of factly, she signs on and begins to respond to drill questions on nutrition. The student is majoring in food services and will spend up to 20 hours in drills and tests to supplement and complete the 31-unit course. Reinforcing and testing what the student has had in class, the nutritional course module relieves the faculty of a significant load of work. It also enables the student to work at her own speed and at times convenient to her.

The significance of this scene is that the school is off-loading faculty work to computer-managed instruction (CMI) and computer-aided instruction (CAI) so it can expand its teaching resources.

"In the food service department," says Institute Director William M. Sirek, "the 15 test and drill course modules enable us to work with 150 students each semester in that department. Without this we would probably have had to limit the program to 50 students."

Considering the cost of developing the instructional materials, is this approach cost effective? Including development, terminal, and computer time, Fox Valley studies indicate that the cost of operating each terminal for an hour is less than $3.

Because Fox Valley staff members have found such modules are both effective and economically justified, they have also developed eight major course modules for the Communications Skills department. These test and drill exercises have so successfully conveyed basic language skills that they were subsequently made available through IBM to other users of IBM computer-based instructional systems, (IUP5796-AKX).

Frederick P. Timm, a communications skills department instructor who helped develop initial CAI courses at Fox Valley, points out how these courses have helped keep a low teacher/student ratio. "If we were trying to allow students to learn at their own pace and had no computer assistance," he says, "we'd need to have about one teacher for every three or four students to be effective."

For repetitive drills, the students appear to prefer working at the terminal in many cases. "Significantly fewer students are dropping out of the communications skills program since the introduction of the computer-managed courses," says Dr. Timm.

Robert Martin, instructional supervisor and the prime mover in computer aided-courses in the food services area comments about the flexibility CAI provides for student schedules. "One of the significant advantages of CAI is that it allows the student to study at convenient times," he says. "This has resulted in a marked increase in the number of students we have been able to place in part-time jobs while they complete their studies. Similarly, more people with full-time jobs can be part-time students. But most important, CAI increases the amount of time the instructor has available to work with the student."

The Institute offers 15 computer science courses, with facilities for online programming as well as courses that contain a portion of tutorial material as well as drill and testing under CAI.

Adaptability of course material to computer-managed instruction is important, according to William Barribeau, an instructor in accounting who has developed several courses to facilitate his teaching. "For example, it is possible for our new accounting students to review and learn accounting terminology through CAI modules. Students who require only a brief review of those terms can complete these modules quickly and devote their time to other study while those introduced to these terms for the first time can benefit from the patience and time the computer offers to grasp these new ideas. Classroom time to bring the students together on basics is now minimized and the instructor can move forward with the objective of teaching accounting," Mr. Barribeau says.

For the past five years, Fox Valley has made available to its instructors several short courses that help them develop their own CAI modules.

Learning Style

Students investigate how they can best learn through cognitive style mapping, a success-oriented, prescriptive approach to classroom management that can be called on routinely by students and instructors. Fox Valley's system uses a computerized inventory process to determine 27 achievement and personality components that make up a person's preferred style of learning.

The cognitive mapping process was adopted from the work of the late Dr. Joe Hill of Wayne State University. Dr. Hill's Theory of Cognitive Style claims that by determining the 27 achievement and personality components of an individual, a map can be derived that generally indicates the ways in which the individual learns most readily. The Cartesian product generated by Dr. Hill's process is quite useful to trained guidance professionals.

When Fox Valley adopted cognitive mapping, it added a computer process that interprets the Cartesian product in language that faculty and students can also readily comprehend.

Dr. William A. Ihlenfeldt, manager of Special Services, who introduced the school to cognitive mapping, says, "The interpretation from the cognitive map is quite literal so we were able to program the computer to follow the logic and select the statements that describe the characteristics implied in the map. Since the tests are scored by computer and the maps are generated by computer, the next step had to be to have computer programs derive the conclusions in lay language."

"In fact," he says, "the records are maintained on direct access storage so that we can call up the map or the statements for use by guidance counselors or faculty members. They have recourse to this information as long as the student permits us to maintain it."

When reviewed by a guidance counselor and student, the results can be revised, if warranted, to alter the map and derived statements.

Cognitive mapping has been so well received and so inexpensive to process that Fox Valley has made the testing and processing available to other schools for a nominal fee.

Information and Advisement

For Fox Valley to maintain a nontraditional schedule format, a special system is required that obviates the customary batch processing of information about students, classes, courses, and instructors. Developed by the Fox Valley staff for capturing information about asynchronous events, it is called the Student Information and Advisement System.

Files about students, courses, classes, and instructors are maintained on direct access storage. Programs enable authorized individuals to access, update, add to, and withdraw documents from these data files. The system permits Fox Valley administrators and faculty to perform online at display stations such functions as: registration, admission, program advisement and modification, transcript preparation, class roster generation, fee processing, grade posting, graduation listing, and refund processing.

"This makes it possible for our registration process," says Joseph Wiegand, data processing manager, "to respond to each student individually when that response is most reasonable from the student's point of view."

"At the same time, it enables us to bring together the best possible combination of students, staff, and facilities at all locations in the district. We are using all the classroom, shop, and instructor resources to the maximum.

Most programs are running to capacity with many having waiting lists. This means the maximum number of students may be served at the lowest cost. That's true even though we enable students to register, depending on the program, daily, weekly, every six weeks, every nine weeks, and every 12 weeks, in addition to traditional 18-week semesters.

"It's possible for students to complete and get credit for courses finished before or after a scheduled course ending. The instructor can turn in grades for posting to student's records and those grades will be part of the record the next time a counselor or instructor wants to review a student's program.

"Admitting a student to a class at the last moment presents no problem for the instructor, because we generate a new roster, indicating an addition to the class, in time for the next session. Similarly, if a student withdraws within the allowed time, we can process a refund and generate a new roster for the instructor," says Mr. Wiegand.

System Overview

Fox Valley has an IBM System/370 Model 138 installed with four 3350 disk files providing 2.5 billion bytes of online storage. Terminals, including 40 IBM 3270 display stations, are located in the library, the Communication Skills laboratory, food services, counseling and guidance, the testing and evaluation center, the cashier's office, admissions and registration, the financial aid office, the course scheduling office, and in the data processing area. Terminals are also located on the four remote campuses.

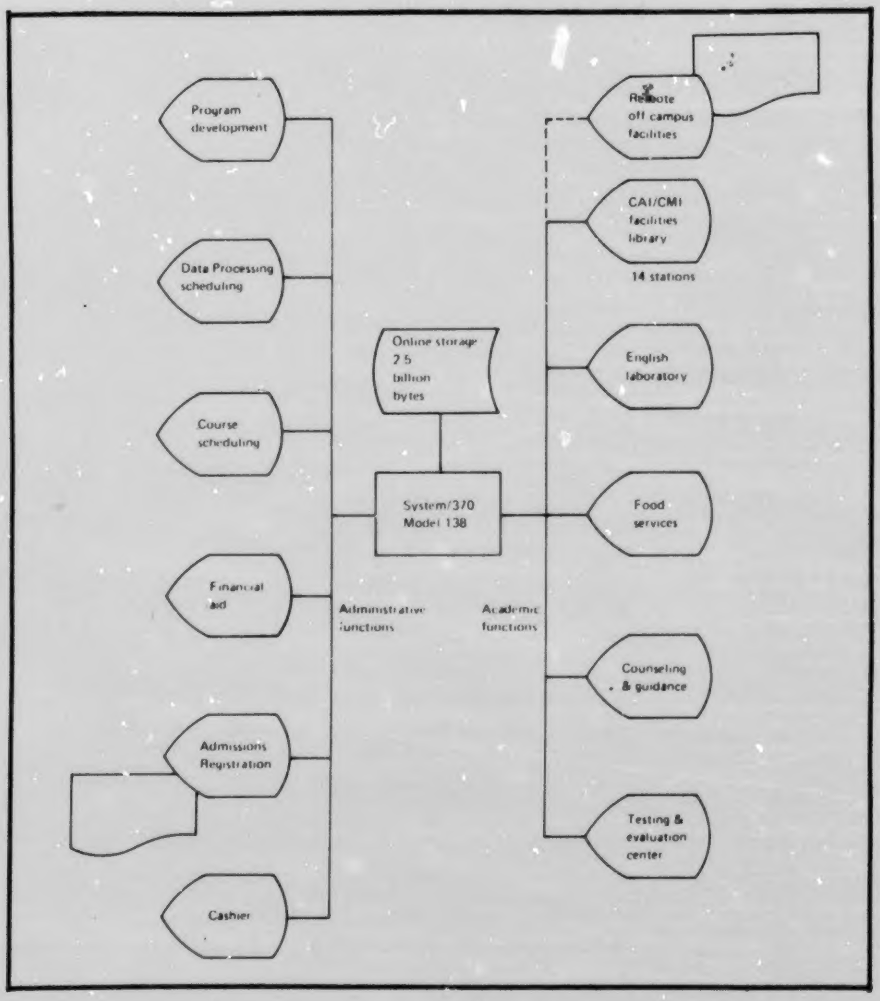
The Model 138 operates under the Disk Operating System/Virtual Storage (DOS/VSE) and uses the Customer Information Control System (CICS/VS) to provide routines for traffic among the terminals.

Data Language/I (DL/I) is used at Fox Valley by the application programming staff in the development of administrative systems for the school. The Data Dictionary program product is also used in conjunction with this development. ICCF is used for program development and for instructional use.

Don Beno, who directs Fox Valley's financial affairs and oversees the computing facilities believes the decision to invest in data base software was an excellent choice. We can respond quickly to requests for information for State audits because our computer tools work well for us."

New applications are often considered or changes are required such as a new State imposed course on taxonomy. "DL/I allows us to meet new requirements without drastic change in our existing application software. Further, we do this work with far fewer programmers. DL/I provides the integrity we need for our record system. When programmers were largely responsible for the maintenance of these records, errors would occur and the student data lost. I don't worry about this now," says Mr. Beno.

The Institute recently installed the Interactive Instructional System, a software package that combines the functions of course development and operational support. Like IBM's Coursewriter, the Interactive Instructional System guides the instructional staff at Fox Valley in preparing courses. Through its interactive language, the system facilitates the development of a variety of approaches to online instruction. Language and data collection components of this IBM software enable faculty to enter, test and modify their courseware with ease. Fox Valley developed another program, the Response Evaluation System, to provide summarized reports of student reponses so course developers can see how effective their courses are, and how well students are progressing. The program is being made available by IBM as an Installed User Program (5796 - ANZ).


Program development
Data Processing scheduling
Course scheduling
Financial aid
Admissions Registration
Cashier
Online storage 2.5 billion bytes
System/370 Model 138
Administrative functions
Academic functions
Remote off campus facilities
CAI/CMI facilities library
14 stations
English laboratory
Food services
Counseling & guidance
Testing & evaluation center

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CAI/CMI Course Modules Used at Fox Valley

Department	Course	CMI	CAI	Fox Valley Devel.
Accounting	Accounting I	X		X
	Accounting II	X		X
	Accounting III	X		X
	Accounting IV	X		X
	Debit/Credit Concepts		X	X
	"T" Accounts		X	X
	Financial Statement Analysis		X	X
Advertising	Advertising I		X	X
Career Development	Career Development		X	X
Chemistry	ALCHEM	X		
	Graphic Art Chemistry	X	X	X
Computer Science	DP Number Systems		X	
	Computer Concepts		X	
	Computer Architecture		X	
	Computer Assembly Language		X	
	System/360 & 370		X	
	DOS Operator Training		X	
	DOS Multiprogramming	X		X
	Terminal Simulations		X	
	Simulation Gaming	X		
	DL/I Basic	X	X	
	DL/I Advanced	X	X	
	VSAM	X	X	
	Intro to Computers	X	X	
Geography	State Capitols	X		X
Ecology	Activities Affecting Envirn.		X	X

CAI/CMI Course Modules Used at Fox Valley (cont'd)

Department	Course	CMI	CAI	Fox Valley Devel.
Education	Instructional Strategies		X	X
English	Comm Skills, language		X	X
	Comm Skills, vocabulary	X		X
	Reading	X		X
	Vocabulary of trades	X		X
	Technical Report Writing	X		X
	Letter Writing	X		X
	Logical Reasoning	X		X
	Reading for slow readers		X	
Fire Science	Building Terms	X		X
	Fire Science Terms	X		X
	Fire Science Hydraulics	X		X
Food Service	Baking	X		X
	Basic Foods	X		X
	Food and Beverage Controls	X		X
	Food Equipment Layout	X		X
	Food Purchase & Marketing	X		X
	Food Styles	X		X
	Garde Manager	X		X
	Meat Analysis	X		X
	Nutrition	X		X
	Short Ordering	X		X
	Quantity Production	X		X
	Service	X		X
	Evaluations	X		X
	Sanitation	X		X
	Banquet and Catering	X		X
	Integrated Management Systems	X		X
Guidance	Guidance Simulation	X		X

CAI/CMI Course Modules Used at Fox Valley (cont'd)

Department	Course	CMI	CAI	Fox Valley Devel.
Marketing	Marketing I		X	X
Mathematics	Math Basic Skills		X	X
Nursing	Anatomy & Physiology	X		X
	Pathophysiology	X		X
Political Science	Juvenile and Criminal Justice	X		X
Paper & Pulp Technology	PPCHEM	X		X
Secretarial Science	Filing	X		X
	Business Law		X	X
Sociology	Sociology	X		X
Welding	Welding Safety	X		X

Courses at Fox Valley with CAI modules include English, food service, accounting, and data processing

Computer-Assisted Instruction

Competency-based courses allow a student to "test out" from a course as soon as the required proficiencies are achieved. The result is that some students finish an 18-week course in 18 weeks, some finish it in 14 weeks, and some finish it in 12 weeks. Computer-assisted instruction enables students to learn at their own pace, drill themselves on the subject, and take exams when they feel ready, even if this takes longer than the scheduled 18 weeks.

On the 56 course modules available through computer terminals at Fox Valley, most are aimed at the drill and testing functions that free instructors from a significant portion of routine work with the students. The use in English Communication Skills is a good example. Students pursuing degree or diploma programs at Fox Valley are tested for basic communications skills and capabilities to determine their reading skills and reveal specific weaknesses. Once communication competency is determined, course elements are prescribed, as necessary, to help teach skills students lack.

English

The eight English Communication Skills course modules, available from IBM, teach English grammar concepts. Each concept represents a major competency category, based on program areas as determined from continuing research on English grammar for students entering Fox Valley. If program areas change in future years, module content can easily be modified.

CAI/CMI English modules are administered at terminals in drill and practice mode, while the computer monitors student progress through the prescribed sequence. At any time, the student can repeat particular study segments, get a performance report on himself, or review questions.

The instructor can call up a particular student's record and check his progress. This enables the instructor to see when a student is having difficulty with a specific area of study and when he should become personally involved in correcting any problems. This process allows the instructor to put his time to best use, helping students who really need the help and avoid holding back students who learn well at an advanced pace on their own.

The computer is used to facilitate the process of testing students when they feel they have learned course material. By building a large bank of test questions and having the computer randomly select a test for each student, virtually every exam can be different. This precludes the temptation to study for a "standard" test. When the computer grades an exam, test results are available quickly, without a great deal of instructor effort.

Accounting

The initial feasibility of CAI was discovered in the business education division at Fox Valley. The accounting department has developed many different types of CAI applications, ranging from drill and prescription evaluation to basic tutorial. The drill and evaluation materials covering accounting terminology are used by students enrolled in Accounting I, II, III, and IV. The department is planning to develop similar materials for Cost Accounting I and II. Tutorial materials are available for such topics as Debit/Credit Concepts, and Financial Statement Analysis.

Data Processing

The data processing department has implemented a number of courses offered by IBM to augment the data processing program. These materials cover a fairly broad range of topics from basic number systems to the understanding of virtual storage concepts.

Food Services

The CAI effort in the food services area began in 1975 with the implementation of test questions for a Nutrition II unit. This trial effort was successful, and subsequent work began. The initial approach was that of computer-managed instruction involving test, diagnostic and prescriptive approaches. This has been broadened to encompass tutorials as well. CAI/CMI materials are in use by students in 15 food service courses.

In addition to the traditional applications that aim at the cognitive domain of learning, food service modules have been developed that related to the affective domain. These modules ask the student to evaluate themselves (personal traits and characteristics) or to evaluate the instructional process.

Life Sciences

The life science department has incorporated the use of two CAI applications into its area of study. These materials, through a short tutorial and review, cover fundamental topics in anatomy and physiology.

Fire Science

The fire science department first developed materials that were problem solving in nature, providing supplemental information on fire hydraulics. Subsequent effort led to the development of materials relating to fire science and building construction vocabulary.

Course development is a continuing occupation at Fox Valley. As instructors recognize its value for other faculty members, they are curious about the applicability in their own area.

"We work with instructors to identify courses that can reasonably be conveyed at a computer terminal," says Shelley Foster, manager of CAI. "We encourage them to learn to use the coursewriter portions of IIS to write their course modules and offer assistance during the development phase. After the first course is operational, they are eager to set up other modules and are much more at home with the development process. They become our best sales people for CAI."

Response Evaluation System

Fox Valley personnel designed the Response Evaluation System to provide detailed reports that summarize the data collected from the student response facility of the Interactive Instructional System. Reports from this system help assess student progress, course objectives, and use of CAI at the institution.

Other reports indicate the activity and the interaction taking place. They help the instructor get information on overall students and group or class performance and proficiency. They indicate when a student has used CAI and what answers or comments the student has made. Given this kind of report, the instructor can better evaluate how students are progressing. In addition, reports enable the instructor to determine how well the course content is understood, and how well the tests measure what they purport to measure.

Another set of reports from the Response Evaluation System helps management at Fox Valley evaluate the use of CAI. This activity can be reported on area, course, group, student, day, or range of days. With these reports, the school can determine the current usefulness of CAI modules, and identify changes or trends in the use of CAI.

The evaluation system has proved to be of such significant value to the school that it was adapted by IBM as an Installed User Program (5796 - ANZ) that can be ordered from IBM.

Student Information System

The administration at Fox Valley set up the online Student Accounting System so the school could manage the competency based educational process. It enables instructors to accept students into classes and record the successful completion of course requirements without regard to the conventional semester calendar. It permits the registrar to register students into classes and programs at virtually any time during the year as long as the instructor feels the student can accomplish progress. Setting up course and student records and preparing class rosters for the instructors are done without special effort by computer processing.

Student data files consist of an hierarchical structure of interrelated and cross-referenced files. The files can be accessed by the data processing staff, by the registrar's office, or by a department head, in the online mode. Inquiries can be addressed by specific record, by exception criteria, or by processing the entire file.

In the registration process, the student codes or checks courses desired on a registration form. The registar's staff checks the form, totals the fee, and determines online whether there is any problem in registering for these classes either because the class is full or because there is a time conflict.

After selecting courses at the registrar's office, the student takes the registration form to the cashier where fees are paid, and the cashier enters the transaction on a terminal. This updates the student's records, and permits credit to be given the student when classes are satisfactorily completed.

Among student records maintained by the system are personal information, program admitted to, courses taken and grades received, courses now being taken, attendance, and current financial status.

The master course approval file contains the approved courses and such information as department category, hours, title and credits. The course offering file lists the dates and locations of available courses, with pointers maintained to instructors and student records. The instructor file lists the courses they administer.

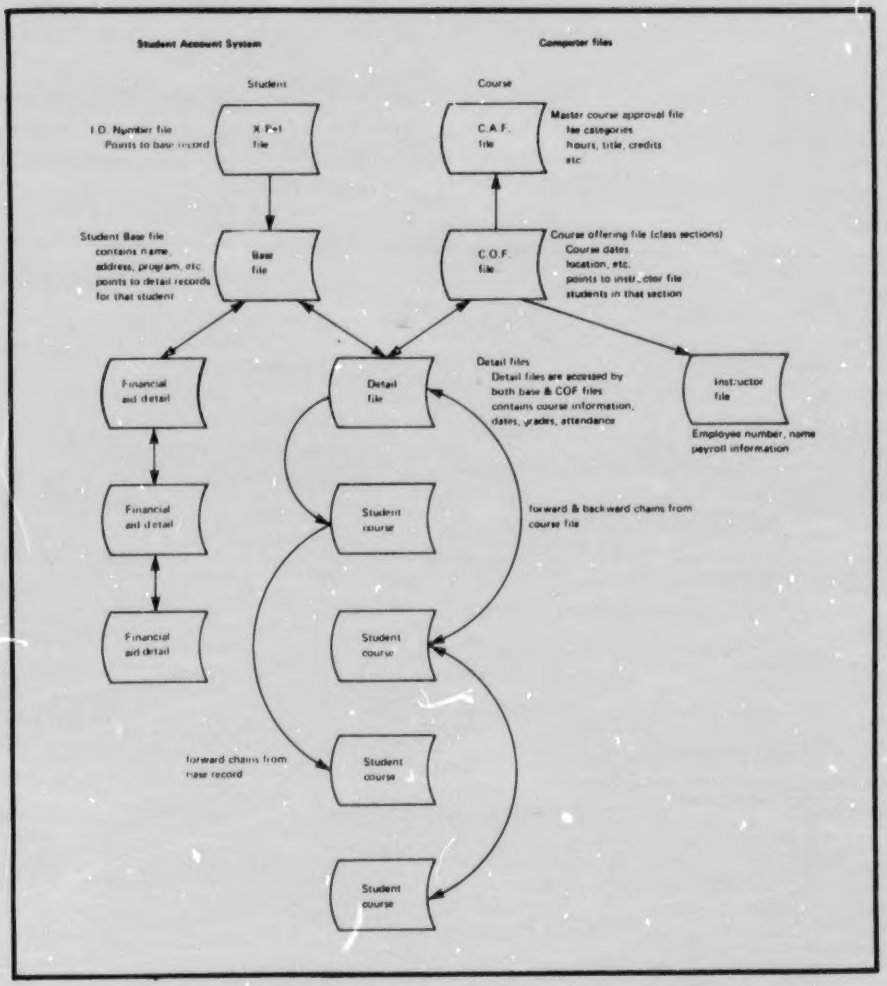
Efficient use of the disk storage for student files required a chaining technique in organizing that portion of the files. Since students' programs vary widely in the number of courses taken or in the years enrolled, a standard record format for all information was not practical. Certain general information such as name, address, social security number, and program, are maintained in a base file. A pointer at the end of this record takes an inquiry to a detail file and then to student/course records stored at the next available space and chained by pointers.

Inquiry responses and reports generated by Student Accounting System programs can begin with the master course, course offering, or student identification number. By searching through chained records, the information about a student, a course, or a specific class, can be developed all online in a matter of seconds.

Terminals regularly accessing the Student Accounting System files are located in the registrar's office, the cashier's office, supervisors' office areas and the guidance area.

Cognitive Mapping

A three-step process is used in the Fox Valley cognitive mapping. First is the inventory process that a student begins by reacting to a set of hypothetical situations and answering various achievement questions on a mark sense


Student Account System
Computer files
Student
Course
I.D. Number file
Points to base record
X-Ref
file
C.A.F.
file
Master course approval file
fee categories
hours, title, credits
etc
Student Base file
contains name,
address, program, etc.
points to detail records
for that student
Base
file
C.O.F.
file
Course offering file (class sections)
Course dates
location, etc.
points to instructor file
students in that section
Financial
aid detail
Detail
file
Detail files
Detail files are accessed by
both base & COF files
contains course information,
dates, grades, attendance
Instructor
file
Employee number, name
payroll information
Financial
aid detail
Student
course
forward & backward chains from
course file
Financial
aid detail
Student
course
forward chains from
base record
Student
course
Student
course

form. Responses are processed to the computer by an IBM 3881 Optical Mark Reader. A program analyzes the responses, and translates them into the cognitive style components. A second program then translates the cognitive style components into a working narrative prescription for each student. The program uses a set of algorithms that combine, compare, and contrast various components in the cognitive style. The computer program analyzes the 27 style components, and selects any of 68 prepared statements that describe the particular individual.

"Many schools have looked at cognitive mapping as a viable tool," says Dr. Ihlenfeldt, "but have not implemented it because it has represented such a time consuming manual problem. Fox Valley's programming staff surmounted the problem by developing computer processing for the cognitive mapping."

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FVTI COGNITIVE SYLE MAP FOR                      ID NO                 SEX F

(C) COPYRIGHT FOX VALLEY TECHNICAL INSTITUTE 1

                                  PROGRAM 158 POLICE SCIENCE

PROCESS DATE   78/07/27           TEST 6 SCORE 30
CURRENT DATE   08/11/78           TEST 4 SCORE 60 GRADE +15.0 PERCENTILE 96

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'  12      12       12    .     .     .  .       .     TVL 60-69   CP   40-49
'T(AL)   T'(AQ)   T'(VL)   .     .     .  .       .     TAL 50-74   CS   60-69
.                          .     .     .  .       .     TVQ 00-25   CT   10-19
'C(CES)           Q'(V)    .     .     .  .       .     TVL 90-99   I    70-79
'C(CS)                     .     .     .  . M     .     TAQ 30-39   A    26-29
'Q(CET)                    .     .I    .  .  R'   .     TVL 40-49   F    40-49
'Q(CEM)                    .   A' .  .     L .     CEM 50-59   M    50-59
'Q'(CP)                    .   F' .  .       .     CES 80-89   D    20-25
'Q'(CK)                    .     .     .  .       .     CET 50-59   R    30-39
'Q'(CKH)                   .     .     .  .       .     CH  20-25   L    60-69
.                          .     .     .  .       .     CK  40-49
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LECTURES, CASSETTE TAPES ARE EFFECTIVE TOOLS FOR TEACHING CONCEPTS AT ANY
   LEVEL OF DIFFICULTY.
PICTURES, SLIDES AND DEMONSTRATIONS ARE USEFUL TOOLS FOR TEACHING CONCEPTS OF
   AVERAGE DIFFICULTY ONLY.
PROBABLY WILL REQUIRE PACING BY AN INSTRUCTOR UNTIL CONFIDENCE BUILDS.
SUGGEST OBSERVATION TO DETERMINE IF MOTIVATION IS NECESSARY.
SEEMS TO PREFER A SITUATION WHERE GROUP INTERACTION IS MINIMAL.
IS VERY CONCERNED ABOUT APPEARANCE OF FINISHED PRODUCT.
APPEARS TO HAVE LOW INTEREST IN PRACTICING BASIC MOTOR SKILLS TO ACHIEVE A
   HIGH LEVEL OF PERFECTION; MAY NEED ADDITIONAL MOTIVATION TO ACHIEVE MASTERY
   ON MOST TASKS.
SEEMS TO PREFER MUCH INTRODUCTORY WORK IN NEW SITUATIONS TO IDENTIFY ROLE.
PROBABLY NOT INTERESTED IN ACCEPTING A LEADERSHIP ROLE IN A GROUP SITUATION.
MAY NEED INDIVIDUALIZED ATTENTION WITH MOST ACTIVITIES REQUIRING MOTOR
   COORDINATION.
HAS LOW AUDITORY (SOUND) DISCRIMINATION.
INDICATES A PREFERENCE FOR A STRUCTURED, FACULTY-PACED SITUATION (GROUP OR
   INDIVIDUALLY).
APPEARS TO NEED TIME AND MUCH INFORMATION TO APPRAISE BEFORE MAKING A DECISION,
   ESPECIALLY WITH NEW TASKS.
APPEARS TO USE RULES/DEFINITIONS TO MAKE A DECISION.
APPEARS TO LEARN MATHEMATICS MORE EFFICIENTLY USING AUDITORY METHODS (CASSETTE
   TAPES/TUTORS/TEACHERS).
READS AT AN ACCEPTABLE LEVEL.
GRAMMAR SKILLS ARE ACCEPTABLE.
WRITTEN MATERIALS (TEXTBOOKS, PACKAGES) ARE EFFECTIVE TOOLS FOR TEACHING
   CONCEPTS AT ANY LEVEL OF DIFFICULTY.
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Output of the cognitive mapping process is the Cartesian format (top) that can be used by qualified professionals, and the Fox Valley-developed interpretation (bottom) that can be reviewed by counselors, instructors, and students alike.

Student Advisement

One of the techniques that has become extremely popular because of the system is the analysis of a student's program at a terminal. A guidance person can call up the student's records and then quickly show how courses already taken might be applied to a different program. To do this with a catalog is confusing and requires that the advisor list courses and exceptions tnat are often not clear to the student. The computer can calculate the requirements of a program transfer within a second or two, and then after the student has had a chance to discuss what appears on the screen, the computer will produce a printed copy of the results for the student to keep for reference.

Conclusion

The Fox Valley Technical Institute has stressed computer application development to make possible an educational system that fosters economy of time, money, and resources for its students and itself.

Techniques such as CAI and cognitive mapping help achieve this fundamental objective. Even with the impressive array of computer equipment and system development effort, the school maintains a low per student cost figure each year, demonstrating that its systems are oriented toward effective use of resources. For many institutions individual instruction has been little more than a theory. At Fox Valley the computer has enabled a faculty to make this theory a productive tool.

Future

In 1980, an IBM 4341, is scheduled to be added to the computing configuration with additional 3270 terminals, primarily in remote locations.

Major new on-line application systems in financial accounting, personnel, inventory control and new offerings in instructional computing are scheduled for the year.

The computer at Fox Valley has become an important administrative and instructional resource.

Reprinted with permission of Shelley W. Foster, Manager of Computer-Based Education and Training, Fox Valley Technical Institute, Appleton, WI 54913.

Education/CETA Linkage Project
Lake County Area Vocational Center
#1222-21

Computer Assisted Competency Based Data Processing

The following information was provided by Richard W. Glogovsky, Assistant Director, Lake County Area Vocational Center, Grayslake, Illinois. The developers of the program are Jim Sands and Bob Parker from the Lake County Area Vocational Center. The program is used on the Apple II DOS 3.3 and is designed for regular, disadvantaged and slow learner students. Drill and practice, tutorial and problem solving formats are utilized.

Abstract

The intent of the project centered around developing a series of microcomputerized programs focusing on:

1. Informing students about the types of jobs available in data entry and computer.
2. Assessing an individual's ability to succeed in data processing or computer programming work.
3. Enabling individuals to build and develop job skill levels in computer programming and data entry work.

Competency-based student learning guides were also developed to accompany the programs developed in the project. The guides were written to give students directions to better understand those activities required in completing a microcomputerized program.

CETA clients involved in field testing the materials (programs) developed by the instructors and gave valuable insight related to the adaptability for future use in the classroom. Materials and programs field tested were modified as required to make them useful in a classroom situation. Upon completion of field testing, it was determined that the materials were very useful to individuals interested in pursuing data processing as a career.

Introduction

Data entry and computer programming are two of many jobs available in the area of data processing which students can be trained and placed into entry level positions. Both areas of study require a variety of different skills and those who enter the data processing field must choose which of the two career paths would best suit their abilities and interests. Most students, especially CETA clients, are unaware of their own abilities and lack of knowledge about career opportunities available to them. The intent of this proposal was to develop programs for a microcomputer that will assess an individual's data processing skills and provide that person with enough information in order to make a proper career choice. Previously developed competency-based student learning guides developed at the Center and other support materials were utilized in the programming process.

The first series of programs developed was designed to inform the student of the types of jobs available in data entry and computer programming field. Through the use of the microcomputer, students also got a chance to experience some of the duties required within these two jobs. An example of a skill required for data entry work might include having the individual actually key in information and simulate an accounts payable form on the monitor. In simulating computer programming, individuals actually get a chance to key in and run a simple BASIC program. Upon completing these series of these programs, the student became aware of the types of jobs available in data entry and computer programming field.

The second series of programs developed was used to assess the individual's ability to succeed in computer programming and data entry work. The best way to determine if an individual can handle programming is to let them try to learn a very simple language. The objective, in this case, would be to teach them some relatively simple concepts in programming and have those involved apply that knowledge by writing and compiling several BASIC programs. This did not only test their ability to program, but also tested the person's interest in the area of programming. If a student failed in this area, it would be very unlikely that he/she would be able to handle the more advanced programming. A recommendation indicating that they investigate another career path would then be made by the instructor.

Data entry programs developed in this proposal assess the student's ability to key in numbers and letters as well as test for speed and accuracy.

The third series of programs developed was designed to build and develop job skill levels or performance-based credentialling.

When teaching computer programming, the prime objective would be to include information on advanced programming theory, including the understanding of tables and other advanced components.

In performing data entry work, practice lessons were developed in order to increase the student's speed and accuracy in keying information.

LAKE COUNTY AREA VOCATIONAL CENTER

C.A.C.B.I. SUMMARY
October, 1981

HISTORICAL BACKGROUND

There is an increasing demand for people trained in Data Processing skills in Lake County, Illinois. The county has also experienced unprecedented enrollment growth in Data Processing coursework demand, both at the secondary and postsecondary levels. However, many prospective students are not aware of the Data Processing careers which are available. Likewise, once they identify an area of potential interest, they usually find they have no method to assess their ability to be successful in such a career, short of taking actual coursework.

We proposed the design of a self-paced, self-tutored, computer-based instructional system, to allow potential Data Processing students to first identify career interests, and to then allow themselves to assess their potential skills in the area of their interest. We also proposed that this instructional system utilize two major components.

1. Apple II 48K Microcomputer System, with video monitor and disk storage.
2. Competency - Based Instructional Student Learning Guides.

This instructional system would have two primary functions: first, to be informative and secondly, to be evaluative. First, it would inform the student of the various careers available in the field of Data Processing by examining career descriptions in each of the three major groups of Data Entry, Computer Operations and Computer Programming. Through a "hands-on" experience on the Apple II microcomputer, the student could then actually participate in activities normally required of an employee in each of these areas. This would allow the student to get a first-hand "feel" for each of the three career areas.

Secondly, the system would then assess and/or develop the student's ability in at least two of these areas, e.g. Data Entry and Computer Programming. Thus, once a student makes a potential career choice, they would not only have the ability to evaluate their potential for success in that choice, but they could also develop their skill.

PLANNING

The working plan for the project was defined in three separate areas, or segments. Each segment dealt with a distinct responsibility. These three segments are further defined as Informational, Data Entry, & Computer Programming.

Informational Segment Planning

This segment was developed to answer the question "What careers are available in Data Processing, and what are they really like?" Research into commercially available software indicated that such a program was not readily available. Information for the program that was developed was obtained from the Department of Labor Occupational Handbook. This segment was subdivided into two parts. The first part simply provided general career information and statistics, while allowing the student to become accustomed to the microcomputer itself. The second part tested the student's ability in each of the following areas: Data Entry, Computer Operation and Computer Programming.

At the end of this first segment, the student would have obtained a good overview of Data Processing careers, and tested his/her interests and abilities in three specific areas. The software and Competency-Based Learning Guides for this segment were developed by Mr. James Sands using the Apple II Pilot language.

Data Entry Segment Planning

This segment was developed to answer the question "How fast, and accurate are my Data Entry skills, and what can I do to develop them?" Research into commercially available software indicated that a software package named Typing Tutor was available from Midwest Visual, Chicago, Illinois. However, this software package was only suitable for measuring alphabetic keying ability. It did not measure a student's ability to key-in numeric data. The Typing Tutor package was purchased, and a Learning Guide was developed to accompany it, for evaluating alphabetic key-in ability only.

To develop a program to evaluate numeric key-in skills, a program was developed which was subdivided into three parts:

1. Warm-up program - Practice exercises to allow the student to warm-up, and to become familiar with the machine.
2. Timing program - Tests and evaluates speed and accuracy, utilizing five increasingly difficult skill levels. Pinpoints problem areas, i.e. numbers most often missed, transposed numbers, etc. Proposes appropriate lessons based on test results.
3. Lesson programs - Twelve separate key-in lessons designed to develop a student's ability, based on results of the timing program.

This software and Competency-Based Learning Guides for this segment were developed by Mr. Robert Parker using the Apple II BASIC language.

Computer Programming Segment Planning

This segment was developed to answer the question "Can a student learn basic programming theory, and then apply it by actually writing and running a computer program, without an instructor's aid?" Research into commercially available software indicated that a software package named Step by Step was available from Program

Design Incorporated, Greenwich, Connecticut. However, this software package was designed for students at the fifth-grade reading level, and initial testing indicated that it was not challenging enough for older students.

To develop a program, this segment was subdivided into ten lessons, each lesson consisting of three major components:

1. Theory - Lesson theory is provided by interaction between the microcomputer and the student, using a Competency-Based Learning Guide as a reference.
2. Practical - A series of programming exercises, using the BASIC (Beginners All Purpose Symbolic Instruction Code) language, to apply the theory just learned.
3. Evaluation - An objective test administered and graded by the computer.

At the end of each lesson, the student receives his/her score, and the computer begins them on the next lesson, which presents more advanced theory. If the student fails any evaluation twice, the computer requests them to consult an instructor and prevents them from going further.

From the start of Lesson I, the computer stores the student's progress, so that the lessons may be completed over an extended period of time without the student losing track of where he/she was.

This software and Competency-Based Learning Guides for this segment were developed by Mr. Robert Santner using the Apple II PILOT language.

EVALUATION DESIGN AND IMPLEMENTATION

Before the project began, it was felt that:

1. Most potential Data Processing students found it difficult to obtain information on careers in that field.
2. Many beginning students were apprehensive of the computer itself.
3. It was extremely difficult to assess a student's speed and accuracy, in entering data into the computer.
4. It was extremely difficult to assess a student's potential for succeeding in computer programming.

After field testing ended and the CETA eligible students were questioned individually, it was felt that:

1. The students felt quite comfortable in dealing with the microcomputer and associated lessons.
2. They also found the Competency-Based Learning Guides easy to use (although several guides had to be modified as a direct result of student comments).

3. It was easy to evaluate and analyze a students speed and accuracy in the area of Data Entry.
4. It was easier to evaluate a student's progress and potential for success in computer programming.

CONCLUSIONS

We believe that the microcomputer proved itself to be an excellent educational tool. We further believe that the computer based lessons, and the Learning Guides which support them, allowed students to examine the career field of Data Processing and determine their interests. Upon selecting an area of interest, the could then assess their skills in that area.

RECOMMENDATIONS

In the field testing of the Data Entry segment, we did not have sufficient post-development time to evaluate whether the timing and lessons program could actually improve the speed and accuracy of the student's key-in skills. We evaluated the students skills, but time limitations prevented us from assessing progress rates as a result of the usage of the lessons program.

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LAKE COUNTY AREA VOCATIONAL CENTER
Presentation on
"Computer Assisted Competency Based Data Processing"

An Education/CETA Linkage project under Subgrant #1222-21

If you are interested in receiving duplicated copies of the diskettes that accompany the learning guides developed in conjunction with the above project, please follow the procedure listed below.

1. Send blank diskettes (Apple II DOS 3.3) to:

Dick Glogovsky
Lake County Area Vocational Center
19525 W. Washington Street
Grayslake, Illinois 60030

NOTE: An equal number of blank diskettes must be received as compared to the number being requested. Duplication will only be completed for the Apple II DOS 3.3 system.

2. A $2.50 handling cost will need to be included for each duplication disk. (Make all checks payable to Lake County Area Vocational Center.)

3. On the form below, please indicate the specific titles of programs your requesting be duplicated.

REQUEST FOR DISKETTE DUPLICATION
(Clip and Mail)

NAME ______________________________

SCHOOL ______________________________

ADDRESS ____
CITY ZIP CODE

PROGRAM	# OF DUPLICATIONS REQUESTED
1. INFORMATION SEGMENT Informing students about the types of jobs available in Data Entry and Computer Programming. (2 diskettes)	_____ (1 set = 2 discs)
2. DATA ENTRY SEGMENT Assessing an individual's ability to succeed in Data Processing or Computer Programming work. (3 discs: 1) warmup, 2) timing, & 3) lessons)	_____ (1 set - 3 discs)
3. PROGRAMMING SEGMENT Enables an individual to build and develop job skill levels in Computer Programming and Data Entry Work. (2 diskettes)	_____ (1 set - 2 discs)

TOTAL number of diskettes requested for duplication ____

Handling cost per diskette X 2.50

TOTAL to be submitted with request ____

Excerpts from

"COMPUTER-RELATED VOCATIONAL EDUCATION FOR DISADVANTAGED STUDENTS"

Preliminary Report
Vocational Education Project No. 2-8156/D074

School Year 1981-1982

by Geraldine Jaworski, Project Coordinator
Assistant Principal, Franklin High School, Franklin, Wisconsin

H. E. Guzniczak, Superintendent
A. L. Block, Director of Instruction/LVEC
R. A. Kucinski, Principal, Franklin High School

July 16, 1982

funded by the Wisconsin Department
of Public Instruction, Bureau for
Vocational Education

I. Purpose of the Project

The primary purpose of the project was the development and evaluation of appropriate computer-related vocational education for disadvantaged students, including a comparative evaluation of various makes and models of microcomputers along with their respective commercial software packages.

The acquisition of microcomputer hardware was made possible through a related project in the closing months of fiscal 1981. Hardware purchased included two TI-99 microcomputers, three TRS-80 microcomputers, two Apple II units and two Hazeltine terminals. A PDP 1102 mini-computer was expanded to seven terminals to help meet the objectives of the project.

II. Review of Objectives

A review of the objectives with the progress to date for each objective is given below:

Objective 1: "Provide necessary professional growth opportunities for teachers involved in this project to master microcomputer use to the extent that they can use this tool as a regular element in the vocational and/or basic education courses they teach."

The primary source of professional growth was inservice education provided by UW-Whitewater.

Several after school/evening inservice sessions were conducted at Franklin High School. One session dealt with identification of the target group, the disadvantaged student and with teaching strategies to help meet their special needs.

Dr. Donald Zahn and Dr. Richard James of UW-Whitewater conducted two Saturday training sessions for project participants with practical "hands on" orientation to microcomputer use. Software was available for use, preview and evaluation.

Other inservice education opportunities were also available to teachers. The most beneficial proved to be the courses offered by Radio Shack. Approximately 20 high school teachers took six hours of classes on the programming language "Basic" for the TRS-80 microcomputer and received local inservice credit. The Radio Shack courses were available free to all teachers at the school because of the purchase of three TRS-80 microcomputers and were conducted at the radio shack Computer Center in West Allis.

Helping teachers develop confidence in their ability to utilize a microcomputer and removing fear of microcomputers was accomplished by requiring teachers to participate in several projects. For example, all teachers at the high school learned to operate the Wisconsin Career Information System terminal. In addition, teachers keyed into the TRS-80 computer their individual class schedules utilizing software available from Radio Shack and modified by the high school principal. Instruction was also given to department coordinators/area representatives on the utilization of Quick Quiz. This program enabled teachers to construct multiple choice tests that students could use either for testing purposes or as programmed instruction with immediate feedback and reinforcement.

Demonstrations of commercial software available from Radio Shack such as VisiCalc, Profile and Graphical Analysis of Experimental Data were given.

Objective 2: "Cooperate with UW-Whitewater in promoting the similar projects concerning the microcomputer and disadvantaged students developed by that institution and School District No. 5 Franklin."

Dr. Richard James and Dr. Donald Zahn of UW-Whitewater were involved in the inservice instruction of project participants. Any programs developed at Whitewater or utilized in their Business Education Computer Lab were available for preview. Information regarding software available and companies supplying software was also shared. Whitewater's experiences in using the software, dealing with the various microcomputer companies and suppliers, and applying commercial software to specific courses were also shared. A limitation was that the commercial software Whitewater used and/or had previewed was basically in the vocational areas of business education and/or distributive education. Since this project involved all vocational areas offered at Franklin High School (auto/power mechanics, construction, drafting, electronics, horticulture, business education, distributive education, home economics) much of Franklin's search for appropriate software was an independent venture.

Objective 3: "Develop computer-related instructional units for all vocational areas serving disadvantaged students."

The business education department modified the instructional manuals and converted the tape program supplied by Radio Shack with their word processing program *Scripsit* into a student work processing manual. A class on word processing was taught utilizing the three TRS-80 microcomputers and the software, *Scripsit*. Student and teacher reaction was very favorable. The use of a microcomputer to teach word processing concepts proved to be a success. Students learned with actual experience in text editing, correction, proofreading, word/paragraph exchange, left and right justification, saving a document, recalling a document, using header blocks and printing the document.

The *Millikin Math* program proved to be an excellent basic mathematics program that developed skills and corrected deficiencies in the areas of addition, subtraction, multiplication and division of whole numbers, decimals, fractions and percents. For disadvantaged students, motivation to learn when using the computer was considered higher than with the traditional methods. In fact some students who had previously defied the teacher openly responded very enthusiastically when given the opportunity to use a microcomputer.

Students in the Franklin High School alternative vocational education program, a program to meet vocational education needs of potential dropouts, had access to a TI-99 microcomputer within their classroom complex and were able to use the microcomputer on an individualized basis with software modules for LOGO, personal record keeping, and budgeting to gain basic computer literacy. One of the main benefits observed by the teacher, was that because of the high student interest created by the microcomputer, students voluntarily read more. Students used the manuals provided by the manufacturer to teach themselves the Basic programming language and the capabilities of LOGO. Motivation was high. Students were able to use the computer whenever they completed the required course work. For most students this proved to be the motivating force that enabled them to complete the required work rather than waste time during the class hour. Students gained personal life skills, basic survival skills and a basic understanding of microcomputer operation that is needed in many areas of employment as a secondary or auxiliary skill. Students who worked on the microcomputer indicated to the teacher that they enjoyed their work. One student even came to school at 6:45 a.m. to serve a detention with the motivation that he could work on the microcomputer during the detention time. This was a noteworthy accomplishment for a student who had previously demonstrated open defiance of the school district's detention policy. Whether or not the motivational influence of the microcomputer will remain high once the novelty has worn off needs additional long-range study.

A subsequent finding indicated that teacher enthusiasm is a variable that appears to have much influence on the acceptance and [thus] the success of microcomputer utilization within the classroom. Positive teacher attitudes in business education and in the alternative education cannot be overlooked when analyzing growth made by individual students. In both areas, student and teacher reactions were highly favorable. Students achieved the goal, the utilization of the microcomputer, with a high rate of success and personal satisfaction.

In trying to meet this objective...problems surfaced that the project participants never visualized. For example, they became aware that previewing of software is usually not allowed by publishers. Likewise, selecting software through catalog descriptions is a difficult job and not foolproof. The search for appropriate software is time consuming, and costly mistakes can be made in software selection. A particular program sold commercially is not always available for a stated brand of microcomputer. The available commercial software may not fulfill the course objectives. Software may have to be created within the school to fit the particular needs of the course. Because of these unforeseen difficulties, the implementation of the microcomputer into all vocational areas within the time allocated by the project was impossible. Selecting appropriate software to meet specific instructional needs emerged as one of the major factors that made it necessary to extend the original project timeline.

Objective 4: "Evaluate various types of computer hardware against a common set of learning objectives for disadvantaged students."

Three brands of microcomputers were available for study: Apple II, TRS-80, and TI-99. All microcomputers were equipped with approximately the same memory capacity, disc drives, and printing capabilities. Each microcomputer was found to have advantages and disadvantages depending upon its application.

If the microcomputer is to be used by grade school students or handicapped students who do not have good manual dexterity and do not need speed in keying data into the computer, the smaller keyboard of the TI-99 could be an advantage for the "hunt and peck" process of input, but it would be a strong disadvantage to students who have had typewriting instruction and utilize the touch typing method.

Because of the unique construction of the console keybard, the TI-99 microcomputer cannot be utilized in word processing. The TI-99 microcomputer which was studied in this project proved to be a home computer and not a business machine.

Another consideration is where the microcomputer is going to be used. For compactness and portability, the TRS-80 has the advantage. The console, computer and disc drives are all housed in one unit with the printer being the only additional piece of equipment necessary. For sharing the equipment between the various vocational education classes, this proved to be a strong advantage. A complete TI-99 microcomputer with all the equipment necessary for comparison with the Apple II or TRS-80 consists of a console, a monitor, one or two disc drives, a disc controller, a memory expansion unit and a printer. Because of the complex of wires and the size of the microcomputer when all components are connected, this microcomputer is not readily portable. Also, concerns were expressed by teachers regarding the safety of use of the TI-99 with the disadvantaged and handicapped students. An overactive student, or one who became bored or frustrated, could possibly cause damage by disconnecting some of the pieces, playing with the plugs, etc. A student of this type would need constant supervision to ensure that the equipment was used properly.

The Apple II microcomputer consists of four basic components: a console, a monitor which may fit on top of the console, the single or dual disc drive and the printer. This unit can be transported easily and would be even more portable with a computer cart. Both the Apple II and the TRS-80 have consoles that permit the student to use the touch method of keying in data and both have word processing software available.

There is one basic difference in the operation of the TI-99 computer compared to the TRS-80 and the Apple II. The TI-99 software comes in program modules. The module is similar to a cassette tape being inserted into a tape recorder. This system may be an advantage to students with prior knowledge of computer use, but the modules could be destroyed if they are not inserted or removed properly. The modules cannot be copied and saved as backups if problems do occur. A new module has to be purchased, or if a replacement is possible, the module has to be returned to Texas for exchange.

The flexible disc on which software is available is of a standard size for all three microcomputers studied, but the data on the flexible disc is stored in such a way that it works only on one specific brand of microcomputer. Some software can be readily copied onto additional flexible discs. Some have limited copy capabilities (e.g. only three copies can be made). Some software cannot be copied at all. This protects the rights of the author of the software. If the software costs a great deal of money, and will be utilized indefinitely, this may be a disadvantage. This is of particular concern in situations where students with limited experience are using expensive software. A locksmith program is available through some sources that usually allows the computer operator to break through the protective lock on the software in order to make additional copies. [using this program to copy commercial discs borrowed from someone else is not recommended.]

In studying the sources of software, it appears that at this time Apple II has the largest quantity of educational software. TRS-80 software is becoming more readily available, but there seems to be little commercial software available for the TI-99. What is available for the TI-99 is expensive, due to the use of the "modules" format.

The wealth of educational software available from the Minnesota Educational Computing Consortium works only with the Apple Microcomputer. While there appears to be a great amount of software available, the value of some of this software is questionable. Unless the software fulfills specific instructional or management objectives it may not be worth using at all. Software must be critiqued and evaluated with great care and thoroughness.

Service on all three microcomputers has been satisfactory throughout the project year. Repairs usually required that the microcomputer or the component with the problem be taken to a service center where the equipment was replaced or repaired on the spot.

Support services available from the suppliers of the microcomputers used in the Franklin project ranged from excellent to poor. Radio Shack (TRS-80) support services have been excellent. Free classes are continually being offered and whenever a contact was made regarding any repair, any programming problems, or operating procedures, a computer expert quickly handled the problem to the total satisfaction of the staff. Apple II service was also excellent and all contacts made resulted in a satisfactory solution. Solutions to problems on the TI-99 were not as readily available. The microcomputer support staff seemed to be inadequate to meet the needs of users within what the project staff considered to be a reasonable time.

During the term of the project new manufacturers have entered the microcomputer field. Equipment is constantly being redesigned and new models introduced. Consequently, it appears that educators must be constantly aware of changes in the field. *Also, any conclusions drawn as a result of this project could be changed in the near future, depending on new hardware, software, or computer applications that may be introduced into the field of instruction.*

It is important to realize that while hardware is expensive, in the long range its cost may be small in comparison to the cost of staff time and talents to fulfill the educational goals of the microcomputer in the school.

Objective 5: "Develop computer programs necessary to supplement available commercial products."

Some substantial progress has been made in fulfilling this goal in horticulture and auto mechanics but much needs to be done in other vocational areas.

In horticulture, a program has been developed that will store characteristics of 200 genus of shrubs each with up to ten different varieties. A student can feed into the microcomputer the characteristics desired in a shrub (height, width and flower color) and the microcomputer will print a listing of all available shrubs meeting these specifications. The program helps students plan landscapes utilizing various shrubs.

In auto mechanics, a program has been developed to aid in classroom management and record keeping. The program can produce a list of all the auto repair jobs a student has successfully completed, each weighted in point value, and the total number of times each task was completed. Upon completion of a grading period, or the course, the student can receive a copy of his/her record indicating the specific job skills performed. The record can be taken with a student when applying for a job as documentation of skills.

Programs have been developed by students that enable the school to keep student daily attendance via the computer, to produce multiple choice and/or true-false tests on the computer, and for remedial work in mathematics.

Many ideas for additional programs have been formulated and will be implemented if appropriate commercial software cannot be found. Some of the areas being explored are: computer assisted menu planning and budgeting in home economics; comprehension, vocabulary development and spelling for students with deficiencies in these basic skills; inventory and cost control in auto mechanics; payroll, general ledger, accounts receivable and accounts payable in business education; inventory control, sales in relations to cost, supply and demand in distributive education; calculations of quantities of materials for cost estimation and calculation of load for structural members in drafting.

Objective 6: "Monitor learning experiences and achievement of disadvantaged students using microcomputers, evaluate same, and modify instructional methods as needed."

In our original rationale, the mathematics department was involved with the vocational education department because, at that time, our base of computer knowledge and experience lay within the math department. In addition, one skill deficit consistently noted by the vocational education teachers that kept students from realizing their full potential within the vocational class was mathematics.

At the onset of this experiment the school already had corrective and remedial mathematics sections. Students [in these class sections] had quite a prior history of remediation and each student demonstrated one or more of the attributes [attributed to] disadvantaged persons. It was easier to use the existing mathematics groups and the more generally qualified mathematics teachers to obtain the initial feedback than to create new groups for the sole purpose of this study. When students within these corrective and remedial sections were exposed to microcomputers, they, *without exception*, responded favorably (from very enthusiastic to moderately enthusiastic).

An analysis of student learning styles indicated how appropriate the microcomputer can be as a teaching tool in a variety of learning situations. The increase in student motivation and improvement in attitude toward learning when using a microcomputer was attributed to students' positive reactions to this new tool. Feedback from teachers involved in the project has consistently supported the hypothesis that the microcomputer is a very valuable and versatile device that has the potential to meet many learning needs of disadvantaged students.

III. Conclusions

The reader will please note that this is an interim report. At this point, these conclusions appear valid on the basis of experience in one year of the project and data gathered so far.

The following conclusions [can be drawn] at the end of one year of effort:

1. Inservice education is needed to update staff on the current status of microcomputers in the education setting, to relieve anxieties about microcomputers, to give teachers practical "hands on" experience using the microcomputer and to give teachers the opportunity to share knowledge. Cooperation with a nearby university or school district which has previously pioneered in microcomputers is invaluable.

2. Although project participants entered the project with prejudices and personal feelings that one particular brand of microcomputer was the most suitable in the educational setting, the findings of the project did not substantiate these feelings or prejudices. All three microcomputers performed highly satisfactorily and the final choice for a particular school should be based on that school's needs (grade and/or age level, purpose of the microcomputer software available, service available in the area and teacher experience).

   Microcomputer manufacturers are highly competitive and more manufacturers are entering the field. Since the inception of our study, IBM has entered the microcomputer market. Even as these conclusions are being written new models are coming in and these conclusions could be changed in the near future.

3. A preliminary study of student learning styles indicated that visual learning is a significant learning style of a large percent of the target group of disadvantaged students. While the initial studies conducted during the first project year did not produce the data needed to prove the exact amount of learning that resulted from relating learning styles to microcomputer use, they did strongly suggest that the microcomputer is a very appropriate tool for students inclined to visual learning. Teachers need to be more aware of individual student learning styles in order to help students achieve the goals of the instructional program. An analysis of teaching styles in comparison to pupil learning styles within a particular class needs further study.

4. For disadvantaged students in corrective sections aimed at eliminating skill deficits, motivation to learn was considered higher using microcomputers than with the traditional methods. In fact, some students who had previously defied the teacher openly responded very enthusiastically to a computer. It should not be presumed, at this point, that the microcomputer was the total cause of this change. The variables of teacher enthusiasm and novelty of the computer

have to be acknowledged. The benefits of the psychological principles of constant repetition and reinforcement within the practice cannot be overstated. Whether motivation and student achievement will decrease when the novelty of the microcomputers wear off should be studied further.

5. A teacher does not have to be a programmer [in order to] utilize microcomputers in the curriculum. Once the teacher has gained the needed expertise in computer operation and a thorough knowledge of the program being utilized, the computer becomes a partner in the educational process. Many times the frustration caused by the lack of commercial software to fill a specific program need causes the teacher to want to learn to program the computer [in order to] realize greater benefits from this educational tool.

6. While the development of commercial microcomputer software is in its infancy, there are good programs available to help students with basic skill deficiencies in mathematics, English, spelling, etc. Problems exist with [the process of] previewing software, with software which is usable by only one brand of microcomputer, and with the multitude of software available at a relatively high price that is of questionable quality in meeting course objectives.

   Commercial software available for specific vocational skill development is rare. What is available must be carefully previewed to determine if it fulfills the course needs.

   It appears to be a real necessity to have someone within the school who has the ability to program the microcomputer. Creating programs to fit specific teaching situations greatly increases the potential for microcomputers within the vocational setting. Another apparent need is a central agency such as the state department of public instruction or a subagency such as the Cooperative Educational Service Agency would provide a catalog of software available by curriculum areas.

7. As evidenced by the Franklin Public Schools Microcomputer Advisory Committee, *the business community feels computer literacy must be incorporated into all vocational areas to increase employment possibilities for our students and to help students operate more effectively in today's society.* In a rapidly changing society where occupations change, appear and disappear, means must be found to equip students to deal with the world of work. Schools must offer students an education that prepares them for alternative occupational, academic and technical programs beyond high school. Any and all uses of a microcomputer by students will increase the development of computer literacy. Schools must provide basic salable skills in data processing, word processing, data entry, programming, etc. Students must learn to use the microcomputer as a tool for future life success.

8. Word processing can be taught utilizing the microcomputer. Because of the cost of most word processing equipment, few high schools can afford to prepare students for this rapidly growing field of employment. Utilization of the microcomputer allows for more units per classroom at a lower cost. Because of the large number of manufacturers of word processing equipment, students entering this field normally need "on-the-job" training to learn the idiosyncrasies of any particular brand. Regardless of the equipment utilized for word processing, the basic principles of text editing remain the same and these principles can be equally well taught on the microcomputer.

9. The incorporation of microcomputer applications in vocational classes can be a factor in maintaining enrollments in elective classes, particularly where a newly offered computer science class provides a glamor image which is an attractive alternative to the more traditional vocational electives.

IV. Recommendations

The following recommendations are based on the project's findings and conclusions to date.

1. A school district needs a preplanned program of hardware acquisition so that the microcomputer inventory keeps pace with teacher and student interest and with current developments and changes in the microcomputer industry that cause obsolescence to be a fact of life.

2. A set of specifications must be developed and applied to software to help teachers with the selection of appropriate materials. DPI or some subagency, such as CESA, should provide the service of cataloging software by curriculum areas.

3. If a microcomputer is to be shared between various departments, or areas within a department, there must be guidelines to determine which hardware will be purchased.

4. Inservice education has to be ongoing. The microcomputer is in its early stages of development and technological advances must be included in any worthwhile computer educational program.

5. A qualified person within the school should be named to coordinate microcomputer use in much the same manner as an audio-visual coordinator functions.

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FOX VALLEY TECHNICAL INSTITUTE

MICROCOMPUTER SOFTWARE EVALUATION FORM/REPORT*

****

REVIEWED BY: ________________________________ DATE: ________________

****

I. PROGRAM DESCRIPTION:

TITLE: ____

PROGRAM DESCRIPTION: ____

____

PRODUCER/COMPANY: ____

COPYRIGHT DATE: _______ PACKAGE COST: _____ WRITE PROTECTED: YES / NO

BACKUP COPIES: YES / NO REPLACEMENT/COST: _____ WHEN AVAILABLE: ________

HARDWARE REQUIREMENTS:

COMPUTER BRAND: ______________ MODEL: __________ MEMORY SIZE: ______K

DOS (DISK OPERATING SYSTEM VERSION) (X.X): __________ GRAPHICS: YES / NO

LOW RESOLUTION: _____ MEDIUM RESOLUTION: _____ HIGH RESOLUTION: ________

COLOR: YES / NO MONOCHROME: YES / NO BOTH: YES / NO SOUND: YES / NO

PRINTER NEEDED: YES / NO SCREEN PRINT CAPABILITIES: YES / NO

COLOR GRAPHICS ADAPTER CARD NEEDED: YES / NO

STORAGE TYPE: SINGLE-SIDED DISK: _____ DOUBLE-SIDED DISK: ______

(OTHER PERIPHERALS) JOY STICK: _____ PADDLES: _____ LIGHT PEN: ______

COMPETENCY BASED: YES / NO COMPETENCIES LISTED: YES / NO

IN PROGRAM: YES / NO IN DOCUMENTATION: YES / NO

DOCUMENTATION FOR PROGRAM OPERATIONS: YES / NO

LENGTH OF PROGRAM OPERATION: MINUTES: _____ HOURS: _____

INSTRUCTIONAL/LEARNING MATERIALS:

INCLUDED: YES / NO FORMAT: ______________________________

DUPLICATION: YES / NO AVAILABLE: YES / NO COST: ______________

MINIMUM ORDER SIZE OF MATERIAL: ______________________________

LEARNER SUPPORT MATERIALS ARE COMPREHENSIVE: YES / NO (EXPLAIN) ________
____

LEARNER SUPPORT MATERIALS ARE EFFECTIVE: YES / NO (EXPLAIN) ____________
____

::

II. TYPE OF PROGRAM

DRILL/PRACTICE: ______ TUTORIAL: ______ SIMULATION: ______

INSTRUCTIONAL GAMING: _____ PROBLEM SOLVING: ______ REMEDIATION: ________

DEVELOPMENTAL: ______ SUPPLEMENTAL: ______ PRE-TESTING: ______

UNIT TESTING: ______ COMPETENCY TESTING: ______ POST-TESTING ______

CLASSROOM MANAGEMENT: YES / NO RECORDKEEPING: YES / NO

CLASS LISTS: YES / NO TIME RECORDS: YES / NO

NUMBER OF ATTEMPTS: YES / NO GRADE AVERAGING/CALCULATIONS: YES / NO

OTHER: ____

::

III. PROGRAM STRUCTURE

SEQUENTIAL: ______ SEGMENTED: ______ RANDOM GENERATED: ______

DATA SET GENERATED: ______ BRANCHING: ______ USER CONTROL BY INSTRUCTOR: __

BY STUDENT: ______ MENU DRIVEN: YES / NO MULTIPLE MENU LEVELS: YES / NO

FEEDBACK: YES / NO (TYPE OF FEEDBACK) ____________________

COMPETENCY LEVEL: YES / NO CONCEPT LEVEL: YES / NO ITEM LEVEL: YES/NO

TEST LEVEL: YES / NO DRILL LEVEL: YES / NO ERROR LEVEL: YES / NO

MODIFIABLE: YES / NO HOW?: ____________________

WHO CAN MODIFY? ____________________

READABILITY LEVEL GIVEN: YES / NO ON WHAT TEST?: ____________________

VOCABULARY TYPE/LEVEL GIVEN: YES / NO ____________________

DIFFICULTY LEVEL: YES / NO ______ SET: ____ VARIABLE: ____ PROGRESSIVE: ____

CONTENT TYPE/LEVEL: ____________________

CONTENT ACCURACY: YES / NO (EXPLAIN) ____________________

____

BIAS FREE: YES / NO (IF NO, TYPE OF BIAS) AGE: ___ RACE: ___ SEX: ___
ETHNIC: ___ OCCUPATIONAL: ___ OTHER: ____________________

IS BIAS CORRECTABLE: YES / NO HOW?: ____________________

____

PRE-REQUISITE SKILLS NEEDED TO USE PROGRAM: (EXPLAIN) ____________________

____

____

::

IV. PROGRAM OPERATIONS

SIGN ON PROCEDURES: SELF-LOADING: YES / NO DOS NEEDED: YES / NO

DOS INCLUDED: YES / NO CAN INCLUDE ON PROGRAM: YES / NO STUDENT

PERFORMANCE STORAGE DISK: YES / NO NUMBER OF DRIVES NEEDED: ____________

MENU SELECTION: YES / NO HOW? ____________________

SEQUENCING: YES / NO RECORDKEEPING: YES / NO TYPE: ______________

SIZE REQUIREMENTS FOR RECORDS: ______________________________

NUMBER OF USER RECORDS ALLOWED: ______ PRINTING OF RECORDS: YES / NO

TYPE OF RECORD: SCORES: ____ PERCENTAGES: ____ LETTERS: ___ NUMBERS: ___

PACING USER CONTROLLED: YES / NO TIMED: YES / NO VARIABLE: YES / NO

SCREEN SCROLLING USER CONTROLLED: YES / NO AUTOMATIC: YES / NO

PROGRAM SEGMENTED: YES / NO PROGRAM SEQUENTIAL: YES / NO

MONITORING NEEDED: YES / NO TYPE: ______________________________

LEARNERS CAN EASILY AND INDEPENDENTLY OPERATE THE PROGRAM: YES / NO
(EXPLAIN) ____

INSTRUCTORS CAN EASILY IMPLEMENT THE PROGRAM FOR USE WITHIN A COURSE: YES / NO
(EXPLAIN) ____

PROGRAM EFFECTIVELY STIMULATES LEARNER CREATIVITY: YES / NO (EXPLAIN)

PROGRAM APPROPRIATELY USES RELEVANT COMPUTER CAPABILITIES: YES / NO
(EXPLAIN) ____

PROGRAM IS RELIABLE IN NORMAL USE: YES / NO (EXPLAIN) ______________

::

V. RELATION TO COURSE

CONTENT AREA: ____________________ CONTENT LEVEL: ______________

GOALS: _____ COMPETENCIES: _____ OBJECTIVES: _____ UNITS: _____

SEGMENTS: ______ COMPATIBILITY TO EXISTING COURSE MATERIALS: YES / NO
(EXPLAIN) ____

EDUCATIONAL VALUE OF PROGRAM CONTENT: (EXPLAIN) ____________________

PROGRAM PURPOSE IS WELL-DEFINED: (EXPLAIN) ____________________

COURSE GOALS/OBJECTIVES/COMPETENCIES PROGRAM PRESENTS: (LIST) ____________

CONTENT PRESENTATION IS CLEAR & LOGICAL: YES / NO (EXPLAIN) ____________

PROGRAM CONTENT IS GENERALIZABLE TO AN APPROPRIATE RANGE OF SITUATIONS: YES / NO
(EXPLAIN) ____

PROGRAM CONTENT CAN BE INTEGRATED INTO PAST LEARNING EXPERIENCE: YES / NO
(EXPLAIN) ____

USE OF THE PROGRAM IS MOTIVATIONAL: YES / NO (EXPLAIN) ____________

PROGRAM INFORMATION DISPLAYS ARE EFFECTIVE: YES / NO (EXPLAIN) ____________

::

VI. SUBJECT MATTER AREA

CONTENT AREA (LIST SPECIFIC TOPIC/CONTENT/SUBJECT MATTER/LEVEL)

::

VII. PROGRAM COMMENTS

STRENGTHS: ______________________________

WEAKNESSES: ______________________________

::

VIII. RECOMMENDATION

PURCHASE: YES / NO (EXPLAIN): ______________________________

::

IX. PERSONAL REACTIONS

COMMENTS: ______________________________

::

X. SOFTWARE/COURSEWARE ACQUISITION-USAGE-RESALE

FREE: ______ RENTAL: ______

PURCHASE: ______________

SHARE: INSTRUCTOR: __________

LEARNER: ___ NO. OF USERS: ____

SELL: RESELL BY STUDENT: ______

RESELL BACK TO FVTI: __________

::

COPIES TO:

____

____

____

____

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Handicapped Education eXchange

Richard Barth
11523 Charlton Drive
Silver Spring, MD 20902
Phone 301-681-7372 (voice)

The Handicapped Educational Exchange (HEX) is a computerized bulletin board, which is available through the public telephone network. HEX can be reached by dialing 301-593-7033, 24 hours a day, seven days a week. It is primarily intended as a free service to those involved in the education of, or communications with, the handicapped.

To "talk" to HEX, you will need either an ASCII or Baudot terminal. The ASCII terminal may be either a simple terminal or a computer which is capable of running at a speed of 300 baud, using 8 data bits, no parity and 1 stop bit. It should be equipped with a Bell 103-type modem. Baudot callers should use a standard Telecommunication Device for the Deaf (TDD), also known as a TTY (teletypewriter). HEX is set up so that it can handle either an ASCII or Baudot caller, automatically, on the same line. At the moment, we are using only one telephone line but plan to add at least one other line later this year. So, if you get a busy signal, try a little later.

HEX serves as a means of exchanging ideas and information concerning application of technology (such as computers) to aid the handicapped. It may be used by professionals, or those involved out of personal interest, working with the handicapped. If you have an ASCII or Baudot terminal, dial HEX and take a look at the information already on it. If you have something that you would like to pass along to others in the field, you can easily enter it as a new message.

HEX can be useful to you in the following ways:

- A way for the handicapped, and those assisting the handicapped, to make known what sort of devices they need.
- A way for those qualified to provide technical assistance to the handicapped to find out what they might be doing to help.
- A way for those actively involved in designing aids for the disabled to offer suggestions to, and get help from, others who are similarly engaged.
- A way for those having products, services, or information of potential use to the handicapped to make known their availability.
- A way of disseminating information about organizations and programs useful to the handicapped.
- A way of demonstrating the usefulness of computerized bulletin boards to the handicapped.

Concerning this last point, HEX demonstrates a system that could be reproduced in other metropolitan areas. It differs from many other computerized bulletin boards run by computer hobbyists in that it can communicate with TDD's. It is a large enough computer system to accommodate both current messages and an organized data base which can be accessed by subject or category. We are planning to add a hard disk to the system this year in order to increase the storage capability.

At the same time, we are working on the development of a smaller, more affordable system based on the popular Apple II computer. Again, this smaller version of HEX will communicate with both ASCII and Baudot terminals. It is the type of thing that could be afforded by small communities, especially if the deaf and computer hobbyists can get together the resources to set it up. We will be disseminating more information on the smaller system at a later date.

HEX is operated by AMRAD, the Amateur Radio Research and Development Corp. It is funded by a grant from the Office of Special Education, U.S. Department of Education.

For those interested in technical information on how HEX works or how to set up a similar system, please enter a message on HEX or write to the above address. Also, we'd like to hear from you on what you think could be done to make HEX even more useful to you. Of course, we need your help in sending us more and more useful info for HEX. If you have a terminal, please send it electrically. If not, we will welcome it by mail.

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INTEGRATING COST-EFFECTIVE COMPUTER AIDED DESIGN (CAD) INTO TECHNICAL PROGRAMS

Victor Langer
Milwaukee Area Technical College
Milwaukee, Wisconsin

Introduction

Is low-cost CAD training in engineering and technical colleges possible through industrial donations? How many students can be served with a four-station turnkey CAD system? Milwaukee Area Technical College (MATC) faced the challenge of high-cost high-tech CAD/CAM education with hardware/software donations and a three year National Science Foundation CAUSE program grant to integrate CAD into technical education, and, with the assistance of industrial partners, developed a competency-based generic 2-D CAD course, advanced CAD courses, an updated faculty, a supportive staff, open laboratory, and a microcomputer CAS emulation to provide low-cost CAD education.

CAD Systems Laboratory

Industry Simulated Laboratory

Colleges will attract students and provide job placements with up-to-date experiences and quality instruction. The investment in current technology must complement the first priority, that of instruction. MATC, with over 70 years of providing quality technical education, has maintained an occupational learning environment typical of the industry. For example, when Public Broadcast Station licenses were first granted, MATC, in 1957, sought and obtained the only two channels still operating today in Southeastern Wisconsin. A major television station became a real laboratory for students in Telecasting and Electrical Technology--Communications programs. When CAD/CAM became a needed skill in the community, MATC again sought to obtain a laboratory typical of the industry. A thorough study was made of the hardware/software options, including timesharing or stand-alone systems. It was concluded that the most efficient method would be to begin on a turnkey system (hardware and software package). Also, it was important in an open lab situation to be able to run the different software packages for Mechanical, Electrical, Architectural, etc., all at the same time. Some systems were ruled out because of this limitation. The problem became cost, not software. On the grounds of practicality, how could installation of a $300,000 system with only two design stations, plus the cost of added facility, staff, and maintenance be justified?

Acquiring CAD System

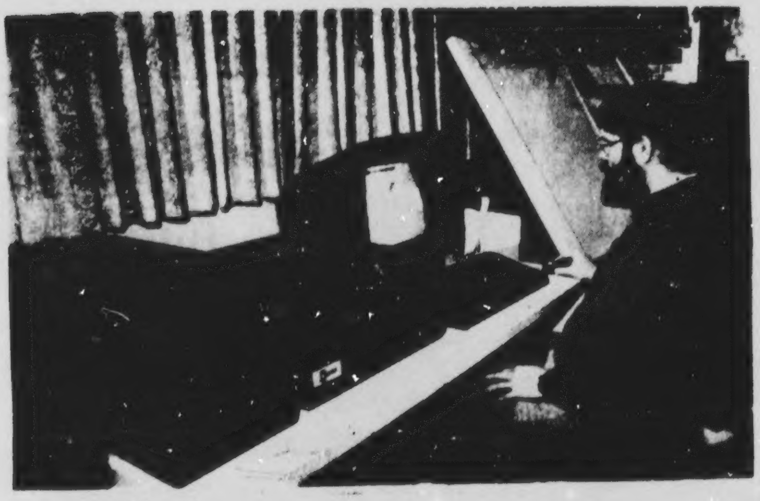
How does a college obtain the support of industry in providing equipment and in meeting other high costs involved? The first step at MATC was to determine the instructional needs, with the help of industrial advisors and faculty. Secondly, the details of an implementation plan were developed which included selecting a system, designing a facility, suggesting supportive staffing, developing priorities, and negotiating with vendors. The third step was to provide institutional commitment with a faculty training program, designated curriculum areas, designated responsible staff, facility availability, and some budget money available to engage in serious vendor negotiations. Fourthly, we established a public relations program with the assistance of industrial supporters to show vendors the advantage of installing a system at MATC. Finally, we were willing to start with anything to begin to show results which would justify all the previous planning and become the basis of future expansion.

MATC CAD System

Computer graphics at MATC consists of two complete Computervision systems, two Cadlinc systems, and MATC MICRO CAD systems designed as follows:

Students in MATC Computer Graphics Laboratory using Computer Aided Design and Drafting System (CADDS) stations by Computervision Corporation.

Computervision--Is the nation's largest supplier of turnkey CAD/CAM systems, and as a partner of MATC provided: (1) Designer IV - CADDS 3 with CGP100 processor, 80 meg disc drive, tape drive, 4 storage tube design stations, large surface digitizer and Interact IV Digitizer/Plotter. (2) Designer V - CADDS 4 with CGP200 processor, 300 meg disc drive, tape drive, 2 Instaview (refresh) design stations, 2 Instaview (refresh color) design stations. (3) Software - Mechanical Design and Drafting, Mass Property, Finite Element, Autohide, NC Machining, NC Post Processor, Flat Pattern Layout, Printed Circuit Design Specs, Data Extract/Data Merge, Printed Circuit (PC) Electrical Schematic Design Rules Checking, PC Design NC Component Insertion, PC Autoroute, PC Autoplacement, PC Geometric Checking, PC Netlist Extraction and Verification, PC IPC Translator, PC Wirewrapping Interface, PC Schematic and Library, Wiring Diagrams, PEP, FORTRAN, I.G.E.S., VARPRO 2, and a commitment for all architectural, robotics, and other new releases.



MATC Cadlinc System

Cadlinc--Emerging as a leader in offering low-cost networked micro systems for design and manufacture of machined parts, and as partner provided MATC with: Hardware: two workstations, each unit with a stand-alone computer (Motorola 68000 micro processor) with one megabyte memory and 10 megabyte hard disc. Software: Graphic Numerical Control (GNC) Surface Modeler, and Design Drafting and Detailing (DDD).

MATC MICRO-CAD (TM)--Was developed at MATC to reduce the cost of design stations permitting use of the Computervision and Cadlinc systems for advanced courses. MICRO-CAD is designed to be used primarily as an educational tool for teaching the basic elements of computer-aided drafting in the introductory course. The software is based on an emulation of most of the general two-dimensional capabilities of Computervision's CADDS-3 (TM) graphics system and uses the same student training manual. Hardware: standard Apple II Plus or IIE microcomputer, graphics tablet, two floppy discs and a green phosphor monitor with no modifications. Software features include:

(1) System Control

* Emulation of Computervision's CADDS-3 command language syntax including mode prompts and response to syntax errors.

* Graphics tablet menu with 154 user-programmable function key squares.

* Split display screen with four lines of command text on the bottom and graphics on top, or full-screen graphics or full-screen text.

* Storage and retrieval of user-created drawings on flexible disk.

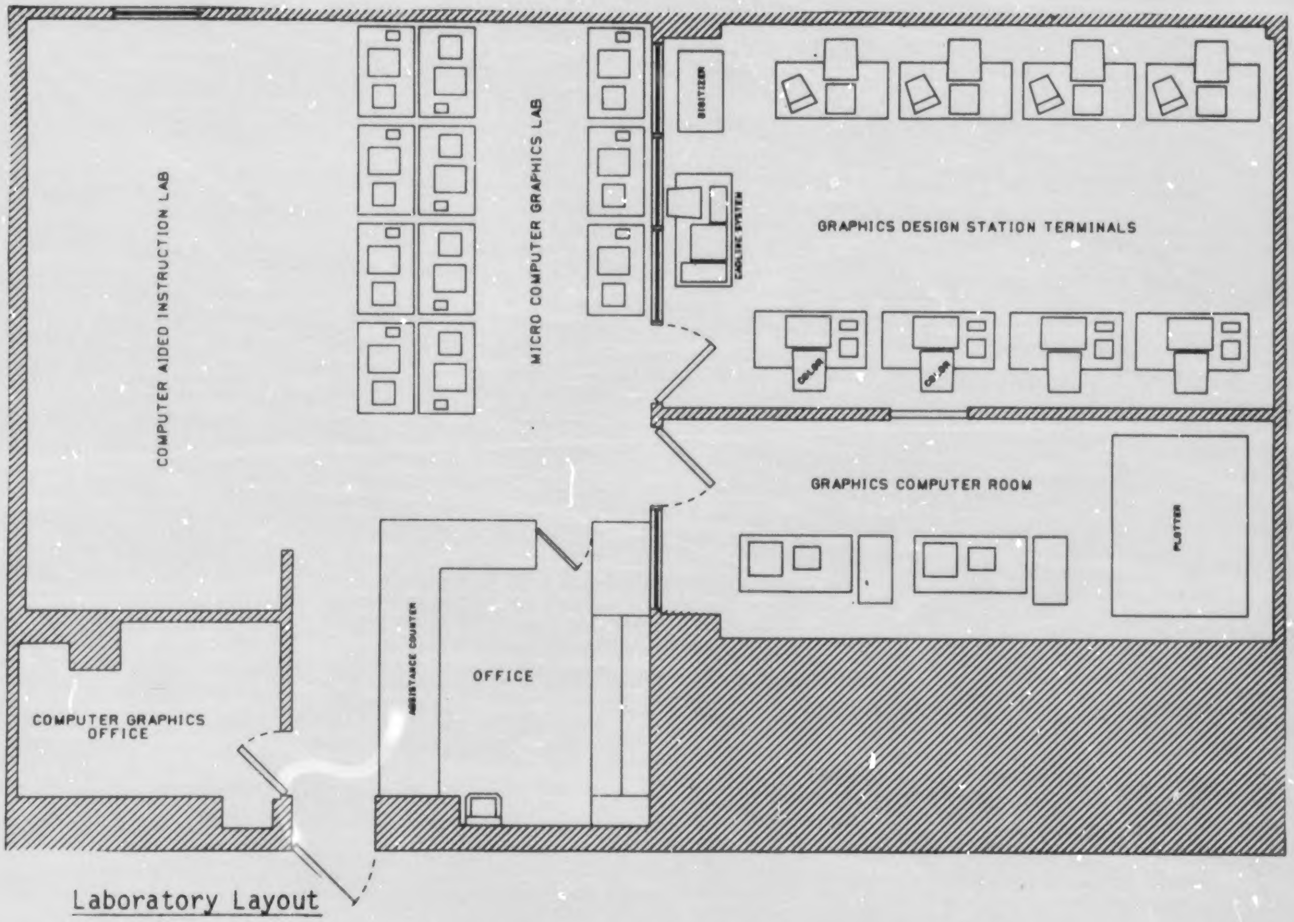
* Plotting of final drawings on a Hewlett-Packard 7470A plotter, or screen image dot matrix plotting on an EPSON MX-100 printer.

* Emulation of Computervision's log-in and log-out procedures.

(2) Geometry Creation and Modification

* Complete data location specification capability through 20D Cartesian or polar coordinates, both absolute and relative (incremental).
* Entity positioning capability for locating the ends or origin of existing entities.
* Verification of entities and measurement of length, distance, and angles.
* Emulation of entire Computervision insert line package (length, angle, parallel, perpendicular, horizontal, vertical, tangent to).
* Complete circle insertion procedure (three-point, two-point diameter, two-point radius, explicit radius, or diameter).
* Six ways of inserting arcs, including specification of beginning and ending angles.
* Inserting points.
* Inserting fillets by radius with automatic trimming,
* Trimming circles, arcs, and lines.
* Inserting text.
* Dimensioning package with specification of text positioning, precision, extension line suppression, and arrows in and out.
* Full 256 layering capability,
* Translation, rotation, or mirroring of existing entities with a copying option.
* Erasure of entities by entity type.
* ZOOM ALL, ZOOM EXTENT, ZOOM UP AND DOWN, ZOOM WINDOW,
* PAGE DISPLAY, SAVE DISPLAY, RESTORE DISPLAY,
* Full selection, specification, and activation of grids.

MATC MICRO-CAD Emulates
Computervision's CADDS Software


COMPUTER AIDED INSTRUCTION LAB
MICRO COMPUTER GRAPHICS LAB
DIGITIZER
CADLINC SYSTEM
GRAPHICS DESIGN STATION TERMINALS
COLOR
GRAPHICS COMPUTER ROOM
PLOTTER
ASSISTANCE COUNTER
OFFICE
COMPUTER GRAPHICS OFFICE

Laboratory Layout

The computer graphics facility was merged with a timesharing computer terimal laboratory which is available to students and faculty for technical computation, computer assisted instruction, and computer literacy. The open lab concept with multicourse service to all instructional departments was the basis for the design. Originally a classroom with a demonstration terminal was needed, but as faculty became experienced in teaching, the terminal in the classroom was used less and less. The classroom portion has now been converted to a laboratory for the Computervision design stations, as shown here.

Maintenance of Equipment

When a timesharing system goes down and there is no backup, it is critical to have immediate maintenance. The equipment vendor provides a monthly rate for services which has provided about 98% reliability in system operation. The microcomputers are maintained by the college Audiovisual Department.

CAD Systems Covered

Students who learn to create complex design geometry on one system are able to transfer skills to another system. The operator can refer to the system manual or call up the command library displayed on the screen. The actual system the student learns is not as important as the CAD geometric applications, concepts, and principles (follow-up study of 116 students).

CAD Employment Outlook

Types of Jobs Available

The area with greatest incidence of application is in the CAD fields of mechanical design, electrical design, and mapping, with applications growing in structural design, architecture, commercial art, and computer aided manufacturing (CAM). The growth of computerization and automation in areas of information management, engineering, and manufacturing is compounding at over 30% a year through the 80's (Anderson Report, December, 1981). Job opportunities for persons with skills in computer graphics are growing equally fast. The general area of jobs and level of training are categorized as follows: (excluding specialization such as mechanical, electrical, etc.)

a) Operate CAD design station, basic digitizing, inserting parts - high school grad with drafting and CAD operator training.

b) Operate CAD design station, drafting and designing tasks - vocational training with drafting, some design, and CAD operator training.

c) Operate CAD design station, drafting, design, and some analysis - two years of college with CAD operator training, drafting, and some analysis.

d) Engineering, perform analytical tasks for design and direct design staff for routine analysis problems or for specialized analytical routines - B.S. with engineering and CAD operator training.

e) Other jobs in areas of Computer Aided Manufacturing (CAM) (numerical control or robotics programming and operation, quality control, etc.), technical illustration, television animation, and printing can use computer graphics at various levels of employment.

Job Outlook Nationally

Today 45 to 55% of the workforce is estimated to be in the information business. By the year 2000, the figure is expected to rise to 80%. Three out of four jobs in the 1980's will require technical training below the baccalaureate level, according to the Bureau of Labor Statistics as reported in "The Shortage of Skilled Workers" position paper, American Vocational Association. In the January, 1982, Electronic Design, "1982 Technology Forecast," it was reported that 7,500 CAD workstations had been installed by the end of 1979, and the number is forecast to grow to 75,000 by the end of 1985. A conservative view leads to the estimate that 50,000 CAD systems will be installed in these four years: 1982, 1983, 1984, 1985. Assuming that 20% of the existing CAD operators leave the field each year and each CAD station is used 1.5 shifts, there is a need to train some 100,000 operators in the four years ahead. In addition, there are many more engineering students, business persons, and engineers who must also be oriented in CAD.

Local or Regional Job Needs Survey

The number of computer graphics systems installed in the Milwaukee area was first surveyed in 1977 by telephoning over 90 industries, and 23 users were found. By 1981, a survey completed by the Wisconsin Chapter of the NCGA found 49 systems and in 1982 this had grown to 88 systems. With an estimated 4 CAD operators per system and 1.5 snifts there should be 528 jobs, and with a 20% turnover plus a 30% growth per year a need for 263 trained persons is projected for 1983. This does not include students, business persons, engineers, computer aided manufacturing persons, and graphic arts or television personnel, as well as other users. The need (possibly demand) was fully realized in the fall of 1982 with over 500 persons on a waiting list for a beginning computer graphics course.

CAD Curriculum Development

Pioneering curriculum development was initiated by General Electric Medical Systems in 1978 to help alleviate a shortage of computer graphics workers. GE reported there was extreme competition between employers for trained personnel, which resulted in a high overhead cost to cover on-the-job training and out-of town recruitment of employees. The cost of training one person up to a level of 1 to 1 productivity was reported as $10,000 each by General Dynamics of San Diego and Martin Marietta of Denver (1980 NCGA Conference Proceedings).

Needs Assessment

A faculty ad hoc committee drawn from representative application fields recommended curricular areas in need of computer graphics training and possible hardware/software, and suggested seeking the advice of an industrial advisory committee. A study visit to the BYU CAD program established in 1976, a survey of local users, and the advisory committee confirmed the need for integration of CAD into eleven program areas. In 1979 MATC staff assisted GE with improvements of its CAD training program and received reciprocal assistance in developing a curriculum, selecting a CAD system, and obtaining vendor contributions.

Advisory Committee

The project advisory committee is usually made up of two members from each occupational area; (mechanical, electrical, civil, architectural, graphic arts, CAM), a high school representative, university representatives, and project faculty. The committee meets two or three times per year and reviews progress of faculty curriculum development, course evaluation, logistical data, and subcommittee recommendations. The subcommittee concentrates on specific occupational areas and has expanded membership to include additional state-of-the-art users in key industries. The project committee's development and curriculum recommendations are referred to the traditional occupational program advisory committee. The program advisory committees are responsible for making recommendations for program development, beginning at the local level of instruction all the way through to the state program-approval procedure. In many cases, the membership serves on both committees.

CAD Integration into MATC Programs

The emphasis at MATC has been, first, to develop basic engineering skills, and second, to provide computer skills that can solve typical engineering/design problems. Knowing how to use a slide rule will speed up engineering if you know engineering. Learning how to use CAD as a tool should similarly speed up production. The challenge has been to determine exactly how computer graphics skills can be integrated into an existing curriculum. Each course and course objectives must be analyzed to integrate these new concepts and experiences into a two-year program. The first priority was the Mechanical Design Technician program, where computer graphics objectives have been integrated into at least six courses. In addition, two computer graphics courses have been developed--an introductory course, which provides computer graphics operation skills, and an advanced course to help students make applications to mechanical design problems, including three-dimensional and descriptive geometry. The generic introductory CAD course is also open to students in Electrical Technology, Civil Engineering Technology, Numerical Control, Commercial Art, Printing and Publishing, and Architectural Technology programs. An advanced course in electrical design includes printed circuit boards, electrical schematics and other related applications. A new Electrical Design Technology program now being developed will emphasize the basics of mechanical design, electrical theory, and electrical drafting first; then add computer graphics skills and electrical CAD. Civil Engineering, Architectural Technology, and Commercial Art Departments are developing advanced application courses that are primarily offered as continuing education opportunities or as assignments for regular full-time students. Continuing education courses offer an opportunity to test new areas with an industrial group, obtain direction for associate degree programs, and establish a relationship with a community of users. In a departure from engineering applications, computer graphics is being integrated into the Telecasting program at MATC's Channels 10 and 36. MATC's training opportunities in computer graphics are also being developed in production-related occupations where design data bases become accessible for production purposes. The Welding Technology Department is developing instructions for obtaining maximum number of parts cut out of a metal plate, automated flame cutting, and robotic welding. The Numerical Control Department developed a CAD to CAM interface going from design to actual cutting operations on numerically controlled machine tools. The Electrical Technology Department teaches industrial controls and other automation devices in a move toward computer-integrated manufacturing. The Electromechanical Technology program is emerging as the basic program for preparing robotic service technicians. The Industrial Engineering program brings together all CAD/CAM activities for efficient management of manufacturing and industrial processes.

Curriculum Outline

The 11 programs needing integrated CAD skills have been identified as having skills provided in existing courses, in elective CAD courses, and required CAD courses. The development of the Mechanical Design Technician and Electrical Design Technology programs (which have the highest priority) is evolving with CAD courses. The programs shown here are in recommended sequence. These program outlines are tentative, subject to advisory subcommittee and committee action, and may be substantially changed before acceptance. The purpose of showing the tentative programs is to provide future direction based on over two years of development rather than showing minimal requirements early in the development phase. Current official programs show only elective treatment of CAD skills.

Proposed Revised Mechanical Design Technician Program

First Year - Semester One

Technical Drafting 1 -- 3 credits
Mechanical Design Technician Orientation -- 0 credit
Manufacturing Processes 1 -- 3 credits
Communication Skills 1 -- 3 credits
Technical Mathematics 1 -- 4 credits
Physical Education - 1 credit
Psychology of Human Relations -- 3 credits

Semester Two

Technical Drafting 2 -- 3 credits
Manufacturing Processes 2 -- 3 credits
Communication Skills 2 -- 3 credits
Technical Mathematics 2 -- 4 credits
Technical Physics 1 -- 4 credits
Introduction to Interactive Computer Graphics -- 2 credits

Second Year Semester One

Technical Drafting 3 -- 3 credits
Descriptive Geometry -- 3 credits
Statics and Strength of Materials -- 4 credits
American Institutions -- 3 credits
CADDS 1 -- 2 credits
Elective -- 2 credits

Semester Two

Basic Tool Design -- 3 credits
Design of Machine Elements -- 3 credits
Basic Mechanisms -- 4 credits
CADDS 2 -- 2 credits
Design Problems -- 2 credits
Business and Industrial Relations -- 3 credits
Elective -- 2 credits

NOTE: The first CAD course is a generic two-dimension course offered in second semester, the second CAD course is a generic three-dimension course offered in third semester, and the third CAD course specializes in mechanical applications offered in the fourth semester. The courses CADDS 1 and CADDS 2 have been proposed and would replace the existing three-credit "Computer Graphics Mechanical Design Applications" course which is presently an elective.

Proposed New Program in Electrical Design Technology

First Year:

Same as Mechanical Design Technician Program

Second Year - Semester One

Technical Drafting 3 -- 3 credits
Descriptive Geometry -- 3 credits
DC and AC Fundamentals -- 4 credits
Electrical Drafting -- 3 credits
Electronics Manufacturing Processes -- 3 credits

Semester Two

Electrical Applications of Computer Graphics -- 3 credits
Electrical Design Problem -- 2 credits
American Institutions -- 3 credits
Business and Industrial Relations -- 3 credits
Electives -- 6 credits

Possible Electives

Strength of Materials -- 3 credits
Basic Tool Design -- 3 credits
Design of Machine Elements -- 3 credits
Basic Mechanisms -- 3 credits
Electronic Circuits -- 4 credits
Electronic Fabrication -- 2 credits
Instrumentation Circuit Design -- 3 credits

Course Development

The first course offered at MATC on an industrial computer graphics system began in August 1980 with two Computervision design stations and 69 students. It was the first known industrial-type interactive computer graphics course offered on-campus at a two-year technical college in the U.S.

The initial curriculum designed for the course was developed in conjunction with a need for CAD training at GE. Max Raisor of the BYU CAD program assisted MATC as a consultant with curriculum and methodology decisions. MATC sent John Erbes, Computer Graphics Coordinator, to the vendor (Computervision) CAD operator training course, and also acquired materials from various corporate in-house training programs. The course materials from General Dynamics of San Diego were most helpful, and the advisory committee provided guidance in stating original objectives. The teaching faculty met frequently to review assignments, exercises, and tests. After 2 1/2 years of development, general agreement has finally been reached on the design parameters of the generic introductory 2-D computer graphics course. For the most part, advanced courses have been one-department responsibilities, and advisory subcommittees have been involved to guide development.

A few of the people taking the introductory course in computer graphics have the mistaken idea that this one course will open up their employment opportunities. Completing an introductory course in computer graphics does not guarantee employment in fields such as computer-aided drafting or computer-aided design. Such opportunities exist only after one has acquired other supportive technical training and skills in specialty areas such as mechanical, electrical, architectural, or structural design; mapping; television; commercial art; printing; engineering; or manufacturing. Complete preparation for a career requires either a comprehensive technical background or additional technical courses.

Basic Course Competencies Developed

The basic CAD course, "Introduction to Interactive Computer Graphics" (2 credits), includes description of computer graphics systems, advantages, applications, and operational skills with emphasis on construction geometry and developing a data base. Competencies include 1) inputting geometric data via keyboard, digitizer, and menu with stylus; 2) editing, filing, retrieving, and screen controls such as zooming, mirroring, rotating, and layering; 3) outputting data for plotting and printing. The operational skills are applied to a 2-D design problems including dimensioning and text. The first course was designed as a generic course with some specialization occurring in the final project.

Prerequisites

The purpose of this course is to allow you to apply your existing technical skills to a new technology. The background skills for this course require one semester of drafting or a year of experience. It is also helpful to have some math background such as algebra or geometry to understand coordinate geometry. A background in computers or computer programming is not necessary.

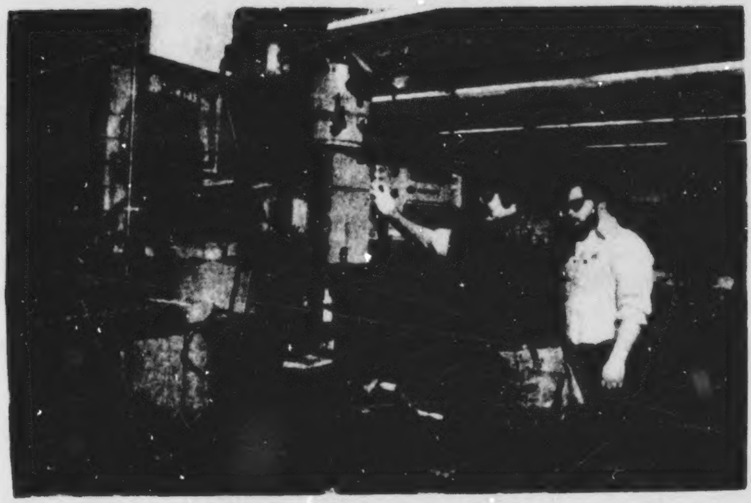
Course Objectives

At the conclusion of this course the student will be able to:

1. Identify the components of a computer graphics system.
2. Apply geometric principles in creating 2-D drawings on a computer graphics system.
3. Create 2-D drawings using the graphics terminal, digitizer, and plotter as design and drafting tools.
4. Apply conventional industrial practices in creating and storing drawings as a common data base for documentation, manufacturing, accounting, etc.

Units of Instruction

1. General Description of Computer Graphics
2. Computer Graphics System Operation
3. Basic Entity Creation
4. Using Screen Control Commands
5. Grids and Coordinate System Review



MATC Wells Index Computer Numerical Control (CNC) Milling Machine

6. Inserting Lines, Circles, Arcs, Points
7. Inserting Dimensions and Text on Drawings
8. Changing Text
9. Entity Modification
10. Grouping, Tagging, and Chaining
11. Crosshatching and Line Fonts
12. Mirroring, Moving, and Rotating with Copy
13. Layering
14. Operation of Equipment

Advanced Computer Graphics Training

MATC offers opportunities to apply advanced computer graphics system to further automate design, engineering, and manufacturing processes. The student entering advanced courses needs even more technical skills in his/her specialty areas. The person with both the technical skills and advanced computer graphics training has numerous employment opportunities available. Currently there are three advanced courses offered, one in Mechanical Design, one in Electrical Design, and one in Computer Aided Manufacturing. There are several others in development. Future advanced courses are planned, including structural design, architecture, technical illustration, robotic modeling, and numerical control machining.

Advanced CAD Course Competencies Developed

"Computer Graphics Mechanical Design Applications" (3 credits). Instruction emphasizes skill development in three-dimensional mechanical design applications using interactive computer graphics. Topics covered include 3-D construction techniques, auxiliary views, view ports, conic sections, surface construction, intersection, sectioning, multi-view and assembly drawings, bills of materials, and mass properties computations. Prerequisites: "Introduction to Interactive Computer Graphics" and "Descriptive Geometry."

Numeridex and Cadlinc systems processing Computervision's data and directly interfacing CNC milling machine.

Units covered include:

1. Entry Options
2. Dimensioning
3. Tolerancing
4. Constructing 3-D Parts
5. Ports
6. Inserting Entities in Isometric View
7. Editing and Dimensioning Isometric View
8. Descriptive Geometry
9. Defining and Creating a Plane
10. Defining and Creating a Surface
11. Creating a Mesh
12. Creating Multipart Drawings
13. Automatic Hidden Line Removal
14. Mass Properties
15. Perspective View

"Computer Graphics Electrical Design Applications" (3 credits). This course applies an interactive computer graphics sytem to create, store, and document electrical design information. The design of schematics, wiring diagrams, ladder diagrams, multilayer printed circuit boards, panel layouts, and wiring harnesses is included. Lectures on computer assisted design are provided, and extensive hands-on activity with an interactive computer graphics system is emphasized. Prerequisites: One year of practical drafting experience and one course in introductory computer graphics, or consent of instructor. Experience or training in basic electrical theory is also desirable. Units covered include:

1. Review of Basic Fundamentals of Computer Graphics, Course Overview
2. Layering Concepts
3. Nodal Entities
4. Using Nodal Entities

5. Nongraphic Properties
6. Making Schematics and Ladder Diagrams
7. Inserting Nodal Text
8. Library Figures for PC Board Design
9. Circuit Board Layout
10. Text Files
11. Routing the Board
12. Edit Board
13. Preparation of Documentation
14. Application of Documentation
15. Other Electrical Applications

Advanced CAD/CAM Course Developed

The Computervision CAD system at MATC is interfaced through a processor to a CNC milling machine (Wells Index). The processor is either a Numeridex or Cadlinc for file management of NC data.

"CAM/NC Programming" (3 credits). Instruction is given in the construction of a tool path from a previously defined data base. Instruction will also include creating a cutter location file which will be used in part processing. Prerequisite: "Introduction to Interactive Computer Graphics" or consent of instructor. Units covered include:

1. Introduction
2. Editor
3. Basic Construction - Menu, Log-In, Log-Out
4. Tool Library
5. Machine Point to Point (MPTP)
6. Machine
7. Post Processing - 1 and 2
8. Append, Regenerate, Verify - Use, Save, MPTP
9. Machine Profile (MPRO)
10. MPRO - Append, Regenerate, Verify - Use, Save MPRO
11. Machine Pockets (MPOC)
12. MPOC - Append, Regenerate, Verify - Use, Save MPOC
13. Sets, Supersets, Linking and Unlinking
14. Edit Numerical Control Operations
15. Machine Absolute
16. Machine Absolute - Lathe

Integrated Course Competencies Developed

Students in programs not having an elective or required course option receive introduction training by class lectures, visits to computer graphics center, and assignments. Students in advanced courses who have received introductory training have an opportunity to apply CAD as an option to manual procedures. Specific examples in the Mechanical Design Technical Program (606) include:

606-106	Technical Drafting 3 - Computer graphics used in tolerance stackups.
606-130	Statics and Strength of Materials - Computer graphics used in center of gravity, areas, volumes, moments of Intertia, etc.
606-112	Basic Tool Design - Computer graphics used in the design of fixtures and gages.
606-118	Basic Mechanism - Computer graphics used in determining displacements, velocities, and accelerations pertaining to mechanisms.

Continuing Education Minicourses

Special one-day or two-day courses are offered to employees from industry to introduce CAD skills to manual drafters, designers, and manufacturing persons. The first day is a generic 2-D CAD mini course offered as a prerequisite to second-day applications or a 3-D mini course. Some minicourses are aimed at experienced users, providing a technical update.

Teaching Techniques and Structure

The courses have a basic curriculum with the teacher having the complete responsibility for instruction and evaluation. The course materials are competency based and implemented with a lecture/lab teaching strategy to retain the flexibility needed in a changing technology. With the high cost of high-technology training stations, it was not possible nor desirable to schedule a group lab for students with only two design stations. Obviously an open lab with technical expertise available was the only way possible to achieve cost-effective utilization.

CAD course structure includes 2 or 3 credits for 15 to 18 weeks or, offered in a summer session, for 2 or 6 weeks. The activities include:

Lecture

One hour per week or two hours per week for 3-credit courses are scheduled in a classroom setting, using overhead slides and other audiovisual media. Originally, teachers needed a design station in the classroom for lecture, but after they gained more experience and a student manual was developed, classes were conducted without the design station.

Demonstration Lab/Quiz Section

One hour per week is scheduled in the classroom and/or lab when the teachers can demonstrate operations, answer questions, go through practice exercises which were assigned to rehearse system operation, and administer and review for quizzes. This session provides students the opportunity to obtain teacher assistance not available in an open lab.

Open Lab

Two hours per week or up to four hours for three credits. The students reserve a design station to complete assigned lab exercises sometime during the 70 hours per week of open lab. Students sign up for a station in twos or threes. Single students can be bumped by any group of students in order to encourage group sign-up. The group is instructed to shift responsibilities of operator and resource person. It has been found that a pair of students working together is more effective than singles or threes. The open lab is staffed with a person familiar with operation of equipment and lab exercises. Also, a systems manager is available to solve hardware and software problems.

Home Study

Two hours per week of reading, practice exercises to rehearse system operation, and studying.

Learning Activities

The student learning activities in the first course are directed by a course manual divided into instructional units. Each unit begins with a rationale statement or purpose, objectives, reference section, assignment section, and lab exercises. The student entering a course needs immediate hands-on which is accomplished by providing an exercise with each operation step described. As the commands and procedures are learned, the exercises become less directive. Also, the commands begin in the most elementary form for each geometric entity and are continuously reinforced and expanded upon throughout the course. For example, you start with basic points, lines, circles, arcs, etc., and evolve to different ways of constructing the entities. Many variations are applied with the vast capabilities of a CAD system to continuously build skill levels. Emphasis is on problem solving and generic construction concepts permitting an easy transfer to different CAD systems.

Competency Evaluation Tests

The students are assigned lab exercises which must be completed for each instructional unit. Several quizzes are given, graded, and discussed in demonstration, lab/quiz section. A midterm exam and final exam are major tests for grading. Quizzes and tests have been paper and pencil rather than actual system operation. Some teachers also check off the assigned home study exercises, which has proved to encourage student participation.

Credit Value

The credit value of courses was extensively debated, and after a study of lab time and home study time it was concluded that the two-credit value was more suited to the introductory course. There is a tendency to inflate credits in high-tech courses when the instructor desires to include more specialized applications. With an adequate text and course objectives restricted to a generic course, two credits were reasonable. The specialized applications beyond the final project must occur in advanced courses or in other technical courses.

Faculty Development

The development of a high technology area can be a goal of an organization but it is unlikely the results will be successful unless qualified and motivated individuals are involved. In many colleges you will find highly successful programs emerging without significant support given, and it is due to extreme motivation of individuals in spite of the many barriers.

Faculty members are expected to be leaders in their field and secondly, to have tremendous motivation to acquire new techniques. The leader who provides basic CAD operator training to students can get by with minimal operator level background. Teachers who are to provide advanced level training to employees operating a CAD station eight hours a day are a staffing problem, however. The teacher must either be a part-time faculty member from industry with expertise or the regular full-time staff must be given considerable development time over a period of one or two years. During development, the teacher must become an expert user of the CAD system, must have developed a library of specialized application programs, and must have spent considerable time with various industrial users.

Initial Faculty Appointments

Teachers were selected from existing full-time staff as recommended by the instructional division in priority areas, generally without a computer graphics background. In the beginning, four faculty members and project staff were needed to learn the new system together, create files, and develop teaching materials. A graduate of BYU who worked as a local system manager became a part-time faculty member, and teamed with a full-time teacher and MATC Computer Graphics Coordinator to offer the first course within eight weeks of system installation. In August of 1980, 69 students started in a two-design station lab.

Additional Faculty Appointments

During the first year full-time MATC faculty were attracted to becoming a part of the development team with an offer of summer employment, learning a new technology, and professional development assignment with a reduced teaching load. Any interested teacher was invited to apply by submitting a letter of application endorsed by the departmental supervisor. The teacher was invited for a screening and interview including a review of previously developed teaching materials. The interview was conducted by a team of three: Project Director, Computer Graphics Coordinator, and Department Supervisor. The appointed teachers were in the occupational areas given highest priority by the advisory committee, had completed the beginning computer graphics course, and were placed in the highest overall rating category by the interview team according to defined criteria.

Screening Interview Criteria for NSF Project Faculty

(1) Review letter of application: Computer graphics and computer experience, (specialty area) experience, recent practical experience, and curriculum development experience.

(2) Review sample instructional materials. Previously developed units, syllabus, course outlines, etc.

(3) How do you feel Computervision system can be utilized in your field?

(4) Names of (specialty area) computer graphics user companies, application, name of individuals with computer graphic specialty area experience who could serve on advisory subcommittee.

(5) Where does computer graphics fit into specialty area related program? Courses? Student exercises? How much lab time? How would you modify these related programs?

(6) What workshops or courses are needed for continuing education?

(7) What do you think you should do in the summer if you are on the project? Highest priorities?

(8) Would you be willing to teach computer graphics related courses or workshops in day school, evening school, or Saturdays for associate degree, adult vocational, high school contract, and apprentices?

(9) Would you be willing to write or prepare all documentation needed for instructional units, syllabuses, course, programs, project reports, etc.?

(10) Why do you think you should be given this assignment?

Faculty Training in CAD

The selection process does not include assigning a teacher to training; it is strictly an option or choice of the teacher. Since it is a requirement to get on the project, many teachers are motivated to register for the regular MATC course and complete the course like any other student. A plan for special in-service was dropped in view of the apparent success of the strategy. The grades of faculty members registered in the course have usually been at the top of the class. In one summer two-week course with 12 teachers from several Wisconsin districts, the faculty were unanimously in favor of following the regular student course, including all assignments and tests, as preparation to integrate CAD into curriculum. A three-hour discussion on curriculum and methods proved to be a valuable post-course activity.

Faculty Development Plan

After the faculty member has been appointed, a plan for development is agreed upon by computer graphics staff and departmental supervisors. The plan usually requires (1) Teaching the beginning computer graphics course and then special application minicourses which further develops competencies in use of a CAD system and preparation of class materials. (2) Developing CAD application library that can be used in minicourses, advanced courses, or for assignments in other technical courses. (3) Establishing a subcommittee of industrial users to work with during curriculum development and preparation of course materials. (4) Developing stated goals in terms of plans for subcommittee meetings, courses to be taught, tentative schedules, reports for project and advisory committee meetings. Faculty members receive a partial professional assignment to develop these advanced skills. Other faculty members without this time must be extremely motivated individuals in order to achieve the CAD skills needed to be a leader in the field. The rapidly changing technology and needed work with industry take so much time that full-time teachers cannot keep up unless released time is provided.

Industry Resource Faculty

In the beginning most technical sources are available in the community, and methods to utilize these persons must be established. When MATC started the study of CAD, a full-time faculty member, along with a coordinator on a part-time basis, was placed at a local industry on professional assignment. The purpose was to go through a company CAD training program, acquiring skills while serving as training consultants to help the industrial trainers in improving teaching techniques and organizing courses and materials. After this one-semester assignment, the basic curriculum was developed, and a continuing relationship helped guide development of the facility and selection of a CAD system. As the CAD system was acquired and the first courses scheduled, the faculty needed assistance from experienced industrial persons. A part-time faculty member, who was a graduate of the BYU CAD four-year program and a local CAD manager, taught one section of the beginning class. Meetings were held weekly with regular full-time faculty to develop lectures, lab exercises, and tests. In subsequent semesters more sections were added and more industrial adjunct faculty added. Meetings between full-time and part-time faculty continued until the curriculum and teaching materials were perfected. During the academic year, guest lecturers conducted special student programs in specialized topics related to CAD, and a number of field trips were scheduled.

Conclusion

The project implemented a high cost industrial CAD/CAM technology achieving a ratio of 35 students to 1 design station per semester in open lab available 80 hours per week. The design stations are valued at approximately $100,000 each with supportive hardware and software, which if depreciated over five years comes to approximately $5.00 per design station hour plus $1.25 per hour of pro rata maintenance costs. If less than 100% utilization, such as downtime during holidays, exams, early semester, etc., the total cost of industrial turnkey is approximately

$10.00 per hour, plus the cost of facility and staff. A donated system and/or microcomputer will substantially reduce these costs. It was obvious MATC needed to develop a low cost microcomputer CAD emulation to free the indutrial system of beginning students for use by the advanced users.

Data regarding course registration, completions, test results, grades, lab time, home study time, student course evaluations, and follow-up studies have been analyzed with the following conclusions:

1. 67% completion of those registered.
2. 70% students registered are industry employees upgrading skills.
3. Two credit courses and three credit course lab time, study time, and student opinion indicates credits are about right.
4. Correlation between lab time and grade was not significant whereas correlation between home study time and grade was significant.
5. Time spent completing assignments which rehearse CAD station activities reduced time required to complete lab exercises.
6. Students working in pairs at a CAD station (one as resource person and other as operator with roles changing) learned more effectively than singles or triples.
7. Students completing course and starting on entry level job (22) reported the time to learn a new system was less than a day. Emphasis in geometric construction, use of reference manuals, and on-line documentation permitted easy transfer from Computervision to Applicon, Calma, Autotrol, Gerber, CADAM, etc.
8. The productivity of students completing the beginning course is 1 to 1 in comparing CAD to manual drafting. This one semester course produces results comparable to employees in industry with six months on-the-job training. Employees after one year typically achieve 2 to 1 productivity and continue to improve with experience.
9. Faculty training in CAD was conducted by integrating faculty into student courses and reported in a faculty followup as a desirable and effective procedure.

Colleges desiring to offer CAD user courses may begin by obtaining a microcomputer CAD system. The faculty member applying this CAD system will take one to two years to become proficient. The technology is changing so fast, by the time the current state of the art CAD is learned, a new, more capable low-cost CAD system will be available.

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THE IOWA DISK OF BASIC COMPUTER PROGRAMS
INDUSTRIAL ARTS
FALL 1982

DOS 3.3
APPLESOFT

THE PROGRAMS ON THIS DISK WERE DEVELOPED BY IOWA TEACHERS IN TWO WEEK SUMMER WORKSHOPS AT THE UNIVERSITY OF NORTHERN IOWA UNDER THE DIRECTION OF DR. RONALD BRO, PROFESSOR.

THESE PROGRAMS DEMONSTRATE VARIOUS EXAMPLES OF COMPUTER USAGE IN THE CLASSROOM. COMPLEX PROGRAMMING HAS NOT BEEN USED IN THE MAJORITY OF PROGRAMS AND 'LISTINGS' CAN BE A QUICK SOURCE OF 'HOW TO'.

THE DISK IS BEING DISSEMINATED BY THE IOWA DEPARTMENT OF PUBLIC INSTRUCTION, CAREER EDUCATION DIVISION, TO PROVIDE A HELP AND STIMULATION TO TEACHERS AS THEY BEGIN USING MICRO-COMPUTERS.

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5. IOWA CADRE
6. THE COMPUTER SYSTEM
7. QUIT

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2. FRACTION DRILL
3. LOAN AND INTEREST COST ANALYSIS
4. TIME-MONEY
5. PROPERTIES OF A CIRCLE
6. SCIENTIFIC NOTATION
7. TEST PERCENTAGES
8. FOLLY
9. MENU

PRODUCTION PROGRAMS:

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2. PLASTICS TEST
3. ROOF FRAMING
4. HOME CIRCUIT REQUIREMENTS
5. ESTIMATING CONSTRUCTION COSTS
6. SHEET METAL PROJECT COSTS
7. COMMON MACHINE SHOP FORMULAS
8. WOOD SAFETY DRILL
9. BOARD FEET
10. WOOD CHARACTERISTICS
11. ABRASIVES
12. CONCRETE CALCULATIONS
13. MENU

ENERGY AND POWER PROGRAMS:

1. ASSAULT VEHICLE SPEEDS
2. ENGINE TEST
3. ENERGY GRAPHS
4. SUN'S RAYS
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6. BASIC ELECTRICITY TEST
7. RESISTOR COLOR DECODING
8. MENU

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Learning Resource Center: Georgia Southern College

Directory of Computer Assisted Instruction (CAI)

Contact Person: Jayne Williams, Director
Learning Resource Center
Georgia Southern College
Statesboro, GA 30460-8147
(912) 681-5269

The Learning Resource Center at Georgia Southern College develops and provides computer assisted instruction for regular, disadvantaged and slow learner students. Program format includes drill and practice, tutorial, simulation and problem solving. The programs are student controlled and a network system is used. A majority of the CAI programs are developed by Georgia Southern staff members through an authoring system developed by the Medical College of Georgia.

Most of the materials in this manual deal with CAI at the secondary and postsecondary levels. This learning center which successfully operates in a four year college could be duplicated in a two year college, vocational technical school or secondary school. As most of the CAI programs are developed by school staff members the CAI is extremely relevant to the course offerings. The authoring system saves the school staff members from spending a lot of time in computer programming and allows more rapid CAI development.

** Indicates lessons developed in the Learning Resources Center at Georgia Southern College using microINSTRUCTOR, a Microcomputer System for Computer Assisted Instruction, written by Richard E. Progue, Ph.D., Medical College of Georgia.

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BUSINESS

Advanced Accounting, William Bostwick

This practice problem deals with a realistic situation in which a parent company acquires two subsidiaries, by basically different means, and the resulting group operates for several years with numerous intercompany transactions. Students input data to record certain transactions and adjustments to convert the individual year-end financial statements into consolidated statements. The computer then prints out a worksheet showing the individual statements, adjustment, and consolidated statements.

CHEMISTRY

**CHM171:CHMV1 (Chemistry Vocabulary)

Chemistry used to be called an "exact science". Specific words were used, specific measures were made, and specific calculations were performed. The vocabulary is indeed exacting. This is the first in a series of exercises designed to help students master the tasks of using vocabulary of chemistry correctly.

The format of this exercise is corrective true-false. If the statement is true, the student must answer, "True". If the statement is false, the student must write that word or term which will make the statement read true when substituted for the underscored word or term.

**CHM172:NOC1 (Naming Organic Compounds)

The International Union of Pure and Applied Chemistry created a commission and charged that group with the task of devising a system of nomenclature for organic compounds so that each compound would have a unique name easily devised and used world-wide.

This is a series of exercises to help the student master the IUPAC rules of nomenclature.

COMPUTER LITERACY

Apple Tutorial Disk, Microlab

This disk is designed to help a student become familiar with an Apple microcomputer. The LRC uses this disk as lesson number 2 for beginning students.

Beginning Basic, AMS

The purpose of this course, which contains 12 lessons, is to teach the beginning programmer the computer language called Applesoft Basic.

The student will be introduced to the individual commands that make up the language. After the student learns how the commands are used in simple programs, a comprehension quiz is given. The LRC uses this as lesson number 3.

Ken's Apple Tutor, P. Kenneth Morse

This lesson is designed to teach a student how to handle a floppy disk, to switch on the Apple, and to understand some basic microcomputer terminology.

The LRC uses this as lesson number 1 in its Computer Literacy Series.

EDUCATION

**PNS:DBO (Designing Behavioral Objectives)

This lesson is designed to give practice in writing behavioral objectives. Correctly stated objectives are presented, then the student must write objectives using words that are specific and measurable.

**PNS:IMPL (Implementing Behavioral Objectives)

Now that the student is writing behavioral objectives, he/she is asked to select the teacher statements most likely to elicit the desired response from the child.

**PNS:IMPL2 (Implementing Behavioral Objectives)

In the second lesson on the implementation of behavioral objectives, the student is asked to select from several suggested teacher strategies the one strategy which will let the child know specifically how he is expected to perform.

**PNS:IMPL3 (Implementing Behavioral Objectives)

This lesson is a continuation of **PNS:IMPL2.

**PNS:DIP (Developing an Instructional Plan)

The student is asked to develop an instructional plan including diagnosis, prescription, implementation, and evaluation.

**PNS:EVAL (Evaluation)

The student is asked to write an evaluation of child learning and teacher learning in a teaching experience. The lesson includes a checklist of points to be included in the written evaluation. The student is expected to hand in complete instructional plan containing diagnosis, prescription, implementation, and evaluation of the teaching experience.

ENGINEERING

Fundamentals of DC Circuit Analysis, Advanced Microsystems Technology

This lesson contains seven programs designed to provide experience and practice in learning and using the fundamental concepts of DC Curcuit Analysis.

Programs Available:

1. Prefix
2. Ohm's Law
3. Voltage Divider
4. Current Divider
5. Equivalent Resistance
6. Thevenin's Theorem
7. Mesh Analysis

ENGLISH COMPOSITION

Wordy, COMPRess

Wordy is a three diskette package which contains writing assistance lessons with imaginative graphics. The do's and don'ts of composition are taught through examples and quizzes. Topics covered are circumlocution, vague expressions, redundancy, "it is" constructions, weakening intensifiers, pretentious diction, elaborate constructions and unnecessary "is" and "are" forms.

**WRITE:COMP (Composition)

In this lesson on composition, students learn how to construct an essay. They also learn the difference between a topic and a thesis sentence.

ENGLISH GRAMMAR

**COMMA:ICC (Independent Clauses Joined by a Conjunction)

In this lesson, students practice using commas to join independent clauses joined by coordinating conjunctions.

**COMMA:IPAC (Introductory Phrases and Clauses)

Many students cannot correctly use commas after introductory clauses and phrases. They practice their skills in this lesson.

**COMMA:NPAC (Nonrestrictive Phrases and Clauses)

This lesson gives the student practice in recognizing and punctuating restrictive and nonrestrictive phrases and clauses.

**DIP:DO (Do and Don't)

This lesson is designed to give practice in choice between "do" and "does" for students using invariant "do" in spoken dialect. The format is fill-in-the-blank.

**DIP:DO2 (Do)

This lesson consists of further practice in avoiding invariant "do," especially when subject and verb are separated by intervening phrases or when the subject is a collective noun.

**DIP:3PS (Third-Person Singular Subjects)

This lesson was designed to give students practice in the identification of third-person singluar subjects. This skill is necessary for elimination of several types of dialect interference.

**DIP:DSUB (Delayed Subject)

Most students make subject-verb agreement errors when the sentence contains a delayed subject. This lesson gives them practice choosing the correct verb in such sentences.

English Achievement, Microcomputer Workshops
(Suggested Grade Levels 10-12

The program presents the student with groups of 16 randomly chosen sentences or problems. In response to the student's answer, the following will appear on the screen: the correct answer, the error involved, and a corrected version of the sentence. The student receives a full error analysis so that he can know the areas to emphasize in study.

I. Practice for the underlined choice format of the CEEB English Achievement Test, the BSE, and the SAT
II. Practice for the labeling format of the CEEB English Achievement Test, the BSE, and the SAT
III. Practice for the variation format of the CEEB English Achievement Test, the BSE, and the SAT
IV. Continuation of II
V. Practice for the editing format of the CEEB, the BSE, and the SAT

Section II contains diction, wordiness, grammar, cliche', and mixed metaphor problems. Section IV contains sentences with errors in agreement, comparison, parallelism, or punctuation.

English: Basic Mechanics, Educulture

Section I: Basic Sentence Patterns. This lesson gives the student practice in identifying the basic sentence patterns.

Section II: Sentence Patterns with Modifiers. This is a continuation of Section I. Here, modifiers are added to the basic sentence patterns.

Section III: Using Independent Clauses. This lesson gives the student practice in using, identifying, and punctuating independent clauses.

**ENG:SECO (Semicolons and Commas)

The student predicts exercises in which he must correctly use a semicolon or a comma. This lesson is helpful to students whose writing contains comma splices.

**ENG:CS (Complete Sentences)

This lesson is primarily for foreign students. It reviews the two basic parts of a complete sentence: the subject and the predicate. The student practices recognizing complete sentences and determining which part is the subject and which part is the verb.

**ENG:CPDS (Compound Sentences)

This lesson is a sequel to CS. The student practices differentiating between subjects and objects. He also practices differentiating between simple and compound sentences.

**GRAM:CLPH (Clauses and Phrases)

The student practices differentiating between clauses and phrases by typing C and P.

**GRAM:MDCL (Main and Dependent Clauses)

The student differentiates between main (independent) and subordinate (dependent) clauses. This is intended to follow Lesson CLPH.

**GRAM:IS (Use of Is and Are)

This is a lesson on subject-verb agreement in which the student practices using either "is" or "are".

**MAJERR:CS (Comma Splices)

This is one in a series of lessons on major sentence errors. Students practice detecting and correcting comma splices in sentences.

Mechanics I, II, III, Micropi

This lesson format is multiple choice with extensive feedback on both correct and incorrect choices. The coding has been done so that the individual instructor can modify the lessons. Mechanics I, II, III consists of the following:

1. End Stop Punctuation
2. The Comma
3. The Semicolon
4. The Colon
5. The Dash
6. Parentheses and Brackets
7. Quotation Marks
8. Capitalization

Sentence Completion, Educational Software

This program addresses an extensive data base of 400 entries and is ideal as a study aid for vocabulary, grammar, spelling, punctuation, and verb tenses.

An editing option is provided so new entries can be added. The editor can be used to modify the current responses if other nuances are preferred.

Sentence Diagramming, Avant-Garde Creation

This disk teaches usage, parts of speech, types of sentence, and sentence diagramming. It has three levels of difficulty. If the student does well in a level, according to criteria set by the teacher, she/he moves up a level so that she'll/he'll be dealing with more difficult sentences the next time.

* *STUDY2:EBSE (English Basic Skills Exam)

This lesson enables the student to practice for the English portion of the Basic Skills Examination. The format of the lesson is such that the student is required to correct the errors he finds in each sentence.

**SVAGR:THER (Sentences That Begin With the Word There)

In this lesson on subject-verb agreement, students practice using the verbs "is" and "are" in sentences that begin with the word "there".

**SVAGR:HAS (Using Has and Have)

This lesson on subject-verb agreement gives the student practice in using the verbs "has" and "have".

**SVAGR:WAS (Using Was and Were)

This is one in a series of lessons on subject-verb agreement. In this lesson, the student uses either "was" or "were".

**SVAGR:PRAC (Practice on Subject-Verb Agreement)

This is a practice lesson on subject-verb agreement. The student practices using what he has learned in previous lessons to choose the correct verb for each sentence.

**SVAGR:TEST (Subject-Verb Agreement Test)

This is the final lesson on subject-verb agreement. SVAGR:TEST serves as a final test to determine if the student has mastered subject-verb agreement.

**WORDS:POFS (Parts of Speech)

This is the first in a series of lessons on the parts of speech. This lesson covers nouns and pronouns.

FOREIGN LANGUAGES

Foreign/English, SEI

This diskette contains over 900 American vocabulary words that come directly from foreign languages. Each multiple choice question is accompanied by the correct definition, the pronunciation, the originating language and a literal translation, if applicable. Special characters are used in generating the foreign words and pronunciations.

French, SEI

The diskette has over 800 entries including the following formats: French to English, English to French, French to French (synonums), and French phrases to English. Each data base is divided into files such as Easy Nouns 2 or Hard Verbs 1. Programs are generally at the beginning and intermediate levels.

French Object Pronouns, Adapted by Jack Baker, Jane B. Borowsky,
and Jayne H. Williams

This lesson is a drill and practice exercise for French 151 and French 152 students. The program consists of the following lessons:

1. Direct Objects - Le, La, Les
2. Indirect Objects - Lui, Leur
3. Direct/Indirect Objects - Me, Te, Nous, Vous

French Verbs152, by West Fullerton

This lesson is a drill and practice exercise for French 152 students. The program consists of the following lessons:

1. French Verbs (Give the English definition).
2. English Definition (Give the French verb.)
3. French Verbs (Give the person.)
4. French Verbs (Give the passe compose.)
5. French Verbs (Give the imparfait.)

German, SEI

This diskette has over 800 entries including German to English, English to German (synonyms), and German phrases to English. Each data base is divided into files such as Easy Nouns 2 or Hard Verbs 1. Programs are generally at the beginning and intermediate levels.

Spanish, SEI

This lesson has over 800 entries including the following formats: Spanish to English, English to Spanish, Spanish to Spanish (synonyms), and Spanish phrases to English. Each data base is divided into files such as Easy Nouns 2 or Hard Verbs 1. Programs are generally at the beginning or intermediate levels.

**SPA151:PL-L4 (Vocabulary Drill)

This is a series of vocabulary lessons which correspond with the Spanish 151 textbook. The student is asked to type in the Spanish equivalent for the English word.

GENETICS

CATLAB, Conduit

CATLAB is a genetics simulation that allows students to mate domestic cats selected by coat color and pattern. The program then produces genetically valid litters of kittens based on these matings. In using the package, students not only learn the principles behind transmission genetics, they also gain considerable practice in defining research problems, controlling variables, analyzing and interpreting data, and studying causal relationships.

Evolut, Conduit

This introductory unit in evolution and population genetics is intended to teach (1) mechanisms generating variation and the selective process leading to adaptations, (2) adaptation to environmental conditions in relation to survival value, (3) manipulation of models of selection acting on populations, and (4) investigation of the power of selection in producing certain frequencies of alleles in given environment and relation of adaptation to survival.

Students select various parameters, such as zygote type, percent of green alleles, and number of generations, and observe the simulated process of natural selection and evolution.

Evolution, COMPress

The program in this unit illustrates a number of phenomena associated with evolution. Taken as a whole, they illustrate both selective and non-selective ways in which populations change. These class-tested programs are designed for courses in Introductory Biology, Genetics, Evolution, and Human Genetics.

Linkover, Conduit

Students plan and execute genetic mapping experiments to reinforce the concepts of linkage and crossing-over.

Students specify a series of genetic crosses and from the resulting data build up a linkage map of ten genes of a hypothetical diploid species using tree-point testcross technique.

Mendelian Genetics, COMPress

This lesson is an interactive computer-simulated laboratory. It can simulate a wide range of genetic phenomena including dominance, partial dominance, lethality, linkage, and sex-linkage. As many as three traits may be simulated at any relative map location on the same or different chromosomes. Multiple allele system may have as many as five alleles and may display any possible combination of dominance and partial dominance.

Use of the program is divided into units in which specific phenomena are explored according to instructor specifications.

MATHEMATICS

Algebra I, Edu-ware

Program includes definitions, number line operations, sets, evaluating expressions, rules for equation reduction, and posttests.

Algebra Drill & Practice I, Conduit

This package enables instructors to provide drill, practice, and help for students of Elementary Algebra, Intermediate Algebra, College Algebra, and Remedial Algebra. The programs provide virtually unlimited example problems and detailed, step-by-step solutions. Lessons cover the following topics:

Side I. 1. Algebraic Fractions
2. Numeric Fractions
3. Slopes and Equations of Lines
4. Percentages
5. Signed Numbers

Side II.
1. Simplifying Expressions
2. Distance Word Problems
3. Rectangle Word Problems
4. Mixing Solutions
5. Word Problems

Algebra Drill & Practice II, Conduit

These programs are suggested for use in Elementary, Intermediate, College, and Remedial Algebra courses. Topics covered are decimal arithmetic, absolute numbers, solving equations and inqualities involving absolute values, simplifying expressions with integral exponents, factoring linear and quadratic expressions (binomials and trinomials), solving linear algebraic equations, finding roots of quadratic equations, x-intercepts of parabolic graphs and the vertex of a parabolic graph, and solving linear equations.

Algebra Series I, II, III, Opportunities for Learning

Algebra I covers the following topics:

1. Definitions
2. Number Line Operations
3. Sets
4. Evaluating Expressions
5. Equation Reduction

Algebra II covers the following topics:

1. Algebraic Addition and Subtraction
2. Solving Equalities
3. Inequalities

Algebra III covers the following topics:

1. Monomials
2. Polynomials
3. Factoring with Binomials
4. Quadratic Trinomials

ARBPLOT, Conduit

This program is intended for use in Calculus and Analytic Geometry courses. Topics covered are function plotting, limits and derivatives, integration, sequences and series, roots of equations, and differential equations.

Complex Mathematics, Havden Book Co., Inc.

This Mathematics in Basic Series includes the following lessons:

1. Absolute Value
2. Complex Addition
3. Complex Subtraction
4. Complex Multiplication
5. Complex Division
6. Nth Roots of a Complex Number
7. Complex Exponential
8. Complex Number to a Real Power

Discovery Learning in Trigonometry, Conduit

This package uses discovery learning to introduce students to trigonometric functions and their visual representations. Following the Student Guide students use the programs to discover how trigonometric functions are represented graphically and the cause-effect relationships between parts of equations and their graphs.

Students are also led to anlayze equations, taking into consideration such factors as amplitude, period, phase shift, and patterns; to prove that both sides of an identity are equal by transforming one side of the identity into a graph representing the other side; and to graph polar equations.

Elementary Numerical Techniques for Ordinary Differential Equations, Conduit

This package is intended to supplement standard courses in ordinary differential equations at the sophomore and junior level. Topics covered are Euler's and improved Euler' methods, Runge-Kutta and predictor-corrector methods, series solutions, systems of equations, and the methods of Milne and Hamming.

Equations. Opportunities for Learning

This set of three programs consists of random equations to be solved (one variable, one operation--one variable, two operations), use of parentheses, and equations with variables on both sides.

General Mathematics 1, Hayden Book Co., Inc.

Mathematics in Basic series consists of the following lessons:

1. Log to Any Base
2. New Coordinates
3. Rectangular/Polar Coordinates
4. Permutations
5. Combinations
6. Vector Cross-Products
7. Vector Scalar-Products
8. Max/Min Locator
9. Number Rounder
10. Dimension Scalar
11. Histogram
12. Circle Finder
13. Nth Root of a Number
14. Normally Distributed Random Numbers
15. Rational Fractions

**MATHDS:WP (Word Problems for Developmental Math)

This lesson contains nine word problems in the areas of number problems, coin and value, and mixture and percentage suitable for developmental students.

Mathematics I, NYC Technical College

This program consists of the following lessons:

1. How To Use the Computer (The keyboard of the Apple made simple.)
2. Factoring Trinomials (Drill and practice in factoring trinomials with leading coefficient 1.)
3. Advanced Factoring Trinomials (Trinomials with leading coefficient larger than 1.)
4. Using the Quadratic Formula (Step by step solution of quadratic equations by formula.)
5. Simplifying Square Root Expressions
6. Solving Simultaneous Equations (Solving 2 equations in 2 unknowns by the elimination method.)
7. Find the LCD (Find the LCD of algebraic fractions.)

Mathematics II, NYC Technical College

This program consists of the following lessons:

1. The 30 - 60 - 90 Triangle (A description of this illustrious triangle with problems.)
2. The Pythagorean Theorem
3. Plotting Points and Graphing

Mathematics Volume 4, MECC

This module is designed for use in higher education mathematics, linear algebra, and calculus. It includes lessons on graphs, function limits, polyroots, Newton 1 and 2, integration, multi-integrals, least squares, line graphs, row reduction, and matrix linear program 1 and 2.

MATHPROGRAM, Conduit

MATHPROGRAM is intended for use in freshman Calculus courses. Topics covered are elementary calculus concepts including differential equations. The program may be used for sequence generation, function tabulation, and series evaluation.

Math Skills Pac, Sliwa Enterprises

This series of lessons has over 300 problems in the areas of fractions, exponents, equations, and geometry word problems. In addition, there are graphic displays which require interpreting line plots, bar graphs, pie charts, and geometric constructions.

Micro Phys Programs

Menu includes: PC726 Differentiation I
PC727 Maxima/Minima I
PC728 Masima/Minima II
OC729 Relative Rates I

PC730	Relative Rates II
PC731	Integration I
PC732	Differentiation II
PC733	Integration II
PC734	Integration: Plane Areas
PC735	Integration: Volumes
PC736	Integration: Arc Length
PC737	Integration: Surface Area Solids

These are individualized instruction/drill programs. Each program includes problems to be solved and their solutions.

Solving Equations, Educational Activities

Level 1: Solving one variable equations step-by-step
Level 2: Combining terms and solving one variable equations
Level 3: Continuation of Level 2; solving one variable equations

Surface, Conduit

This program is a course supplement for Precalculus, Calculus, and Analytic Geometry. It includes graphs of functions of 2 variables, three-dimensional surfaces in two-space. Students sharpen their ability to visualize three-dimensional surfaces and become familiar with the parameters affecting how such a surface is represented in two dimensions.

MEMORY

A Memory Myth, Micro Power and Light Co.

This is a memory game in which the student tests his/her memory against the computer's. The game consists of 12 levels which range from simple to difficult. The student may climb from the simple to the more difficult level and may also test his memory by the utilization of a built in time element.

MUSIC

Apple Music Theory, Apple Computer, Inc.

This lesson consists of complete drill and practice music fundamental exercises. Exercises include the following:

1. Aural Interviews
2. Counting
3. Enharmonics
4. Key Signatures
5. Naming Notes
6. Note Types
7. Visual Interviews
8. Music Terms
9. Rhythm
10. Scales
11. Sevenths
12. Triads
13. Whole and Half-Step Intervals

Interval Drillmaster, Conduit

This lesson provides students with practice in identifying and notating simple melodic intervals. The software includes 22 levels of interval training and gives students the option of taking each level either as an assisted drill or timed test.

Musicomp, Special Delivery Software

This lesson provides an electronic music sheet on which the student can compose, arrange store and play his/her own music. The lesson comes with pre-programmed tunes and all software necessary to allow the student to enter his/her own. Musical output occurs through the normal Apple speaker. Three "voice" and four "timber" settings are available to alter the tone or composition.

PHYSICS

Group Velocity, Conduit

In this program, students use game paddles to control wave velocity and wave length to demonstrate a traveling sine wave and two types of wave groups by controlling wave velocity and group velocity.

Students select values for frequency, time and wave number to display velocity, ocillation, cosine waves, moving waves, and group waves.

Interp, Conduit

This unit on wave suspension is designed to improve students' understanding of the use of models in physics using the wave theory of light. The Students' Notes provide information to guide students through three investigations of interference and diffraction phenomena using the computer program.

The simple model of the program calculates the intensity due to the superposition of radiation from two sources, or two slits, each having two secondary sources. The complex model allows students to investigate the effects of the number of secondary sources in each slit.

PSYCHOLOGY

Laboratory in Cognition and Perception, Conduit

This package exposes students to a variety of phenomena, theoretical points of view, techniques and experimental designs. The package may be used as a vehicle to demonstrate the use of between-subject, within-subject, and mixed designs; explore the methodological decisions of a researcher; and extend students' knowledge of the processes and phenomena in contemporary human experimental psychology.

READING

Compu-Read, Edu-Ware Services, Inc.

This lesson has four independent programs and two file building routines to help the student increase comprehension and retention. The student sets the initial difficulty level, and the Apple matches itself to his/her performance. The lessons are as follows:

1. Character Recognition
2. Highspeed Word Recognition
3. Synonyms and Antonyms
4. Sentence Comprehension

**PARAGR:MAIN (Main Idea)

This lesson is designed for any student who needs help in finding the main idea of a paragraph. The student reads a paragraph and then chooses the main idea from several choices.

**PARAGR:SUPP (Supporting Sentences)

In this lesson, which is a sequel to PARAGR:MAIN, the student is given a topic sentence. From several statements which follow, he then chooses the one which does NOT support the topic sentence.

**PARAGR:FACT (Fact and Opinion)

This lesson is designed to give students practice in distinguishing between a sentence that is a fact and a sentence that is an opinion.

Although the lesson is primarily for Developmental Reading students, others who wish to sharpen their powers of discernment will also find PARAGR:FACT beneficial.

**PARAGR:OPIN (Fact and Opinion)

This lesson is a continuation of PARAGR:FACT. Students practice distinguishing between fact and opinion.

**RDGII:INFER (Inference)

This lesson consists of ten short paragraphs. The student is asked inference questions about each paragraph. The format is multiple choice.

**READ:LIT (Inference)

This lesson consists of four short fables. Three to four multiple choice inference questions are asked about each fable.

**READ:SENT (Sentence Unraveling)

This lesson is designed to help students understand the "core" of a complicated sentence or paragraph. The lesson consists of five sentences; there are four short answer questions for each sentence.

**READ:HIS (Sentence Unraveling)

This lesson is a continuation of READ:SENT. History is the subject matter of each of these sentences.

**READ1:RWIS (Recognizing What is Said)

This lesson encourages the student to use his critical reading skills. He reads nursery rhymes and then answers various questions about the rhymes. The student learns to pay attention to what the author says.

SPELLING

Spelling, Educational Activities, Inc.

This is a two program series in spelling skill development and drill practice. Each lesson utilizes large graphic letters which increase student interest and readability. The result is an automatic 'flash card' effect combined with student interaction.

Spelling I, II, III, Micropi

The lesson format is multiple choice with extensive feedback on both correct and incorrect choices. The coding has been done so that the individual instructor can modify the lessons. Spelling I, II, and III consist of the following:

1. Suffixes: -able, -ible
2. Doubled Consonants before Suffixes
3. Final -y before Suffixes
4. Final -e before Suffixes
5. Common Homonyms
6. Use of the Letter Combination IE or EI
7. Suffixes: -ly, -ally
8. Common Prefixes
9. Sede - Cede - Ceed
10. Suffix: -ous
11. Spelling Diagnostic

Spelling Builder, Program Design, Inc.

This is a series of 8 programs that teach important spelling rules and build spelling ability. Spelling Builder teaches the rules that apply to "tricky" words and shows that these words aren't so difficult once the rules are understood. Following are the skills taught in this lesson:

1. Syllabication
2. Doubling Final Consonant
3. Final "e" with Suffixes
4. Adding Suffixes to Words Ending in "y"
5. Tricky Plurals
6. "ie" or "ei"
7. Troublesome Prefixes
8. Spelling Exercises (320-word spelling test administered via an audio cassette)

Spelling Volume 2, MECC

This diskette contains 30 spelling drills. Each drill consists of 20 difficult or commonly misspelled words. A partial sentence is presented. The student must complete the sentence by choosing the correctly spelled word from a list. An option allows the instructor to enter unique words and sentences to create additional drills.

Whole-Brain Spelling, Opportunities for Learning

The goals of this program are to develop visual imaging skills for spelling, to offer 200 ten-word lists for spelling practice, and to diagnose and indicate areas for self-correction. This program may be used only on a color monitor. (We suggest that college students begin with Level 100.)

STATISTICS

Descriptive Statistics, Conduit

This package provides supplementary materials to standard textbooks for precalculus statistics and probability courses. Concepts taught include data types, frequency distributions and their graphical representations, measures of location, and measures of dispersion.

STUDY SKILLS

***The following 14 lessons are a series of study skill programs which were written to coordinate with the textbook, How To Read and Study for Success in College by Norman and Norman. The student reads a short selection from the text and then goes to the computer where he answers several multiple choice questions on the material. She/He can refer to the selection at any time during the quiz.

After the student takes the quiz, he checks the material that he did not get correct. Then the student applies what he has learned by completing an activity in the book.***

**STUDY:COLL (College Life)

**STUDY:TIME (Organizing Your Time)

**STUDY:OYRG (Organizing Your Reading)

**STUDY:RATE (Your Reading Rate)

**STUDYHTH (Habits That Help)

**STUDY:UTH (Understanding the Writer)

**STUDY1:BYU (Building Your Vocabulary)

**STUDY1:TEXT (Organizing Textbook Notes)

**STUDY1:LECT (Organizing Lecture Notes)

**STUDY1:SAS (Skimming and Scanning)

**STUDY1:CAR (Concentrating and Remembering)

**STUDY1:TEST (Organizing for Tests)

**STUDY2:LIBR (Using the Library)

**STUDY2:CRIT (Critical Reading)

VOCABULARY AND WORD USAGE

Acronyms, SEI

This diskette has over 1000 acronyms and abbreviations ranging from government to technical, athletics to computers and popular to military. Spelling counts, but hints are given after each try.

**READ1:VIC (Vocabulary in Context)

The student reads sentences which contain a word that he may be unable to define. She/he uses the context of the sentence to correctly choose the definition from four possible answers.

**READ1:VIC2 (Vocabulary in Context)

This is a continuation of READ1:VOC. The words increase in difficulty, however.

**READ1:VIC3 (Vocabulary in Context)

This is the third in the series of READ1:VOC and READ1:VOC2 lessons. The words used in all three of these lessons are designed for students in Developmental Reading.

**READ2:VOCA (Vocabulary)

This lesson is one in which students practice using context to determine the meaning of a word. The words come from the Advanced Level of Words Are Important.

**READ2:VOC2 (Vocabulary)

This is a continuation of READ2:VOCA.

**READ2:VOC3 (Vocabulary)

This lesson is the third in the series with READ2:VOCA and READ: VOC2.

**STUDY2:GRE (Graduate Record Examination)

This is a vocabulary lesson designed primarily for students who are preparing for the Graduate Records Examination. The student reads sentences and chooses the correct definition for the underlined word in each sentence. The sentences were taken from an ARCO book on GRE practice.

Vocabulary Builder, SEI

This lesson consists of over 1600 entries which are stored with synonyms and antonyms. The user selects the desired mode: synonyms for drill or antonyms for test practice.

**VOCAB:VIC (Vocabulary in Context)

This lesson consists of sentences in which the student is asked to use the context of the sentence to determine the meaning of the underlined word. The format is multiple choice.

Vocabulary Builder 2: Advanced, Program Design

This is a series of 11 programs that build vocabulary skills by presenting 400 questions on synonyms and antonyms. A total of 2000 words is presented. Words get more difficult as the student progresses.

Word Analogy, SEI

This lesson has over 1200 word relationships which are saved in the data base, with many questions coming from sample aptitude tests. After attempting to answer each problem, the student has the option of viewing a hint.

**WORDS:SIM (Similar Words)

This lesson was designed to help students learn to distinguish between similar or confusing words. Examples are affect-effect, access-excess, and accept-except. The students are asked to fill-in-the-blank with the correct word.

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MCE Field Study Project

Interpretive Education, Inc.
157 S. Kalamazoo Mall, Suite 250
Kalamazoo, MI 49007

February 1982

Florence M. Taber, Ed. D.
Media Design

BACKGROUND

Interpretive Education, Inc. in Kalamazoo, Michigan is a company of educators designing and producing multi-media programs primarily for the secondary and adult handicapped population. Recently, their first six microcomputer programs in the content area of basic living skills were developed. In order to determine the educational effectiveness of these programs, a field study project was designed and implemented.

Field Study on these microcomputer programs, called MCE, was conducted in three different school districts. One school district is located in a large multicultural metropolitan area in the southeast part of the United States. The twelve classrooms involved covered many areas of special education including gifted and autistic with ages ranging from eight to adult. The second school system, one secondary learning disabilities room, is located in a predominately white middle class suburb of a medium sized town in the midwest. The third system was also located in the midwest but in a very small town and having primarily a rural population. This latter classroom is a secondary resource room involving emotionally impaired and learning impaired students.

All three groups included special education students interacting with the program and teachers who completed an evaluation form. Each teacher was given the option to employ the program as he/she would in the classroom. The questionnaire asked teachers to respond by marking on a continuum to indicate their opinions as to the educational and technical effectiveness of the program(s) used.

Results of the teacher evaluation questionnaires for all three groups may be found in Appendix A. One question was discarded when it was discovered the meaning was unclear.

Suburban Group

Three MCE programs were used in the classroom during a three day period in December 1981 with a mathematics class for learning disabled secondary students. The students, with reading levels from 2.0 through 5.0, used the programs independently without using any of the supplementary material or teaching suggestions from the Instructional Guide. The instructor did indicate, however, that sufficient written materials explaining the program as well as sufficient supplementary materials were available. The program, Income Meets Expenses, was rated highest of the three used in this setting, with You Can Bank on It second, and Money Management Assessment third. On You Can Bank on It it was indicated that higher levels would be a suggestion for an additional option. On Money Management Assessment it was indicated that spelling was difficult. Since no spelling is required it is assumed the instructor was referring to the vocabulary assessment indicating his students need vocabulary reading instruction prior to completing money management programs.

Small Town/Rural Group

The small town/rural group used the field study form to report on the MCE program Money Management Assessment. The results were primarily positive although the teacher was concerned about cost-effectiveness because of severe budget cutbacks in the system. The reading grade equivalent range of this group was 1.5 to 10.8 and the students were all 16 or over. A secondary language arts and a reading developing program used the program. Many of the teaching suggestions and supplementary materials were used as well as many teacher created materials. The instructor indicated that she administered tests to the group but did not report scores. Since the reported gains were in "vocabulary knowledge and concepts pertaining to money management" the vocabulary sheet in the supplementary materials of the Instructional Guide were probably employed. "Other factors which seemed to increase were: 1) student motivation, 2) student independence (work habits and self-pacing abilities) and 3) self concepts." The instructor's suggestions indicated that access is needed into the program in order to start at points other than the beginning. One feature the instructor especially found beneficial was the error analysis feature on the mathematics skill assessment. She feels that more programs in the mathematics and language areas should have this feature.

In the early fall of 1981, this rural/small town special education classroom was asked to do a field study on the MCE program, Poison Proof Your Home. The instructor at that time verbally indicated her excitement about what she termed one of the best programs she had ever seen and one of the few that is educationally effective. Four students viewed portions of this program at a time. The instructor had previously written a set of questions to answer while viewing the program. While viewing the program, one student was in charge and ran the program while the others took notes. At the conclusion of the part of the program viewed, the students answered the questions and discussed other questions that could have been addressed. In order to reinforce the concepts presented in the program, the following activities were carried out:

1. Student-made worksheets created from their notes.
2. List of poisons in the individual homes.
3. Pictures (student drawings) of accident/poison related-incidents -- which resulted in a poster contest.

4. School nurse as guest speaker.
5. Poison identification game -- the teacher brought in items from home and students had to tell why each product was dangerous and how dangerous incidents could be avoided.

Large City Multicultural Group

The most inclusive study was completed by twelve classrooms covering many handicapping conditions housed within a large metropolitan multicultural district in the southeast corner of the United States. All twelve instructors (13 student groups) gave solid three ratings to the material as well as doing pre- and post-testing of their group using the vocabulary tests found in the Instructional Guide of the program. The results of the pre- and post-tests may be found in Appendix B.

Metropolitan Area Analysis by Group

Group A -- EMOTIONALLY HANDICAPPED

This group viewed the MCE program, Job Readiness, independently or in small groups. Considerable growth was noted between pre- and post-testing on the vocabulary tests. It was suggested that a lower branch of presentation would be useful.

Group B -- TRAINABLE MENTALLY RETARDED

This group viewed the MCE program, Job Readiness, in small groups and as a class. Considerable growth was noted between pre- and post-testing on the vocabulary tests. The program was operated independently by the students after instruction and directed supervision. It was suggested that a lower branch with more graphics and worksheets with survival symbols would be useful. The instructor said that he did not believe his student "could do so much... They were motivated and tried hard and learned a lot."

Group C -- LEARNING DISABLED

This group viewed the MCE program, Income Meets Expenses, independently. Considerable growth was noted between pre- and post-testing. It was suggested that more branches, both higher and lower, would be useful; as well as the addition of dittos. These students were extremely motivated and were challenged to provide correct responses so that they were not branched to lower levels. The program also had to be used as a reward because they would otherwise not "get away from the computer long enough to do their work or otherwise let other students use it." She went on to say that "this is the most challenging and motivational teaching tool I've used with these kids in fourteen years."

Group D -- LEARNING DISABLED

This group viewed the MCE program, Money Management Assessment, independently. Again, considerable growth was noted between pre- and post-tests. A lower branch and more worksheets were suggested for additional programs. Another comment noted that a consultant "hounded me to do this -- and now I'm hooked!"

Group E -- GIFTED, ELEMENTARY

This group viewed the MCE program, Home Safe Home, independently. Growth was noted between pre- and post-testing. It was suggested that the concepts could be expanded for the gifted population by adding higher level branches. These students, unlike the learning disabled who tried hard not to make mistakes in order to stay at higher levels, made "mistakes just to see what the program would do."

Group F and G -- TRAINABLE MENTALLY RETARDED
EDUCABLE MENTALLY RETARDED

This group viewed the MCE program, Poison Proof Your Home, first as a group, then in small groups, then individually, and finally in small groups again so that they could reinforce each other. Both groups showed considerable growth between the pre- and post-testing. Some of the students had difficulty with the directions so they were put on the blackboard and reviewed. Charts were used in connection with the program. The vocabulary was used in exercises involving spelling and sentence writing. A field trip was taken to a hospital emergency room where a doctor gave the students a lecture on the subject and actual samples of poisons were shown and discussed. The students also had to be shown the return key and had to learn not to yell "help" when "help" appeared on the screen. One student typed in a vulgar remark when asked to type his name. The computer then referred to him as that vulgarity throughout the program. He then told everybody how the machine had referred to him. Therefore, it was suggested that computer programs consider the possibility of not acknowledging certain terminology.

Group H -- AUTISTIC

This group viewed the program, Income Meets Expenses, independently and tended to view the program "over and over again." Considerable growth was noted between the pre- and post-test. This medium was considered by the teacher to be especially appropriate because the students are "tuned" into machines. According to the teacher --

> "they became very excited -- had to threaten to take away their disk unless they behaved. One boy 'sang' all the directions -- disturbed everyone, but I was thrilled. It's the first time he took an interest! I didn't even know he could add. His mother was so happy, she went into debt to buy him an Apple."

It is understood that the teacher taped the entire printed information in monotone, then talked the same text in a monotone and gradually replaced the machine with herself. In other words, she entered their world as a machine and gradually "humanized" her voice so that the students could reach the "outside" world. The teacher also indicated that music helped the students to concentrate.

Group I -- PHYSICALLY HANDICAPPED

This group viewed the MCE program, You Can Bank on It, in small groups. Considerable growth was noted in this group based on the test results. It was suggested that more worksheets and that branching to a higher level would be useful. Some difficulty was noted for students using mouth probes when they accidently hit keys twice resulting in errors. However, with practice they got better.

Group J -- SOCIALLY MALADJUSTED AND ADJUDICATED

This group viewed the MCE program, Poison Proof Your Home, independently. The program ran to completion with no problems. However, when students "wrote bad words" instead of yes or no, the machine would keep repeating the directions. Considerable growth in vocabulary was noted based on test results. The only comment indicated that a branch to a lower level would be beneficial for lower level functioning students.

Group K -- EDUCABLE MENTALLY RETARDED
EMOTIONALLY HANDICAPPED
LEARNING DISABLED

This group viewed the MCE program, You Can Bank on It, as a class, as a small group, and independently. Again, considerable growth was noted in the group based on this program. "Lower and higher levels could be added"was the only suggestion made by the teacher.

Group L -- PROFOUNDLY DEAF

The MCE program, Home Safe Home, was viewed in small groups by these students. The scores on the post-test were considerably higher than on the pre-test. The teacher suggested more graphics. She also had to sign directions for the students at first.

Group M -- EDUCABLE MENTALLY IMPAIRED
LEARNING DISABLED
EMOTIONALLY HANDICAPPED

This group viewed the MCE program, Money Management Assessment, independently. The results of testing indicated considerable growth. The teacher suggested both higher and lower branches would be useful.

CONCLUSIONS

The results of this field study indicate many positive effects using these microcomputer programs in the cognitive and affective domains -- and somewhat in the psycho-motor domain. The programs also received positive ratings in all areas of content, use of educational principles, and technology. Branching was considered effective, although it was frequently suggested that more branches be added to higher as well as lower functioning levels. Therefore, microcomputer programs that are based on sound educational principles can be educationally effective for handicapped students in many areas of exceptionality -- especially if they are used in connection with other materials and experiencial situations.

ONGOING MCE PRODUCT DEVELOPMENT

Many of the suggestions provided by the teachers involved in the field study have been considered and implemented in the development of the newest MCE programs. The lowest conceptual level is lower wherever possible and an additional level has been added for more advanced students that involves interaction and simulation. Graphics have been and continue to be employed to increase educational effectiveness.

In order to control inappropriate input when the student's name is requested at the beginning of each segment, a test will indicate that the inappropriate name is unacceptable.

Improvements have also been made in the Instructional Guides providing additional supplementary materials and the listing of concepts per part of the program. It is also important to note that each program may now be entered at the beginning of any concept and at any functioning level. This and other options are available to the instructor at the beginning of each program part.

APPENDIX A

Teacher Questionnaire Results

APPENDIX B

Vocabulary Test Results
from
Metropolitan Study Area

APPENDIX A

TEACHER QUESTIONNAIRE RESULTS

(3=High 2=Medium 1=Low)

Question Synopsis	Large City X (n=12 teachers, 12 classes, 6 programs)	Suburb X (n=1 teacher, 1 class, 3 programs)	Rural X (n=1 teacher, 2 classes, 1 program)
1. Prog. Consistent w. obj.	3.00	3.00	3.00
2. Sequenced	3.00	3.00	3.00
3. Vocabulary	3.00	2.67	3.00
4. Effective Branching	3.00	3.00	2.00
5. Inappropriate R, Handled Appropriately	3.00	3.00	3.00
6. Work Independently	3.00	2.67	3.00
7. R to Student R Effective	3.00	3.00	3.00
8. Redundency/ Drill	3.00	2.67	3.00
9. Progress Indication	3.00	2.67	3.00
10. Amount at a Time	3.00	2.00	3.00
11. Section Length	3.00	2.67	3.00
12. Personalized	3.00	3.00	3.00
13. Music, blinks, prompts	3.00	2.33	3.00
14. Graphics, Color, Animation	3.00	3.00	3.00
15. Easy to use	3.00	3.00	3.00
16. Learning Theory	3.00	3.00	3.00
17. Good Use of Medium	3.00	*3.00	3.00
18. Cost-effective	3.00	**1.50	2.00
19. Motivating	3.00	2.00	3.00
20. Improvement Noted	3.00	2.00	2.50
OVERALL VALUE	3.00	2.50	3.00

*Two Responses were "I don't know"
**Indicated other methods were more cost-effective

APPENDIX B

VOCABULARY TEST RESULTS FROM METROPOLITAN STUDY AREA

NOTE: Groups A-J reported the lowest score and the highest score (N) allowing the figuring of the pre- and post-test range of low and high score for each vocabulary test alphabetically coded. The percent given is the percent correct of the total possible for the pre- and post-test scores. The Minimum Growth is the number and percent difference between the lowest pre-test score and the lowest post-test score.

GROUP A

MCE PROGRAM NAME: Job Readiness
STUDENT CATEGORY: Emotionally Handicapped
NUMBER OF STUDENTS: 2
STUDENT AGE RANGE: 12-13
READING GRADE EQUIVALENT LEVELS: 1.7 - 2.3
STUDENT I.Q. RANGE: Normal

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	10%	11	55%	10	50%	16	80%	8	40%
B	0	0%	7	35%	12	60%	14	70%	12	60%
C	1	5%	13	65%	15	75%	18	90%	14	70%
D	2	10%	12	60%	14	70%	19	95%	12	60%
E	0	0%	6	28%	12	57%	17	80%	12	57%

GROUP B

MCE PROGRAM NAME: Job Readiness
STUDENT CATEGORY: Trainable Mentally Retarded
NUMBER OF STUDENTS: 24
STUDENT AGE MEAN: 18
READING GRADE EQUIVALENT LEVELS: 0 - 1.7
STUDENT I.Q. RANGE: 28 - 44

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	0	0%	7	35%	4	20%	10	50%	4	20%
B	0	0%	10	50%	5	25%	14	70%	5	25%
C	0	0%	7	35%	4	20%	12	60%	4	20%
D	0	0%	4	20%	1	5%	6	30%	1	5%
F	1	4%	7	33%	3	14%	9	42%	2	9%

GROUP C

MCE PROGRAM NAME: Money Management
STUDENT CATEGORY: Learning Disabled
NUMBER OF STUDENTS: 41
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 2.6 - 4.1
STUDENT I.Q. RANGE: Not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	12	57%	17	80%	16	76%	21	100%	4	19%
B	7	35%	14	70%	17	85%	20	100%	10	50%
C	0	0%	4	50%	8	100%	8	100%	8	100%

GROUP B

MCE PROGRAM NAME: Job Readiness
STUDENT CATEGORY: Trainable Mentally Retarded
NUMBER OF STUDENTS: 24
STUDENT AGE MEAN: 18
READING GRADE EQUIVALENT LEVELS: 0 - 1.7
STUDENT I.Q. RANGE: 28 - 44

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	0	0%	7	35%	4	20%	10	50%	4	20%
B	0	0%	10	50%	5	25%	14	70%	5	25%
C	0	0%	7	35%	4	20%	12	60%	4	20%
D	0	0%	4	20%	1	5%	6	30%	1	5%
F	1	4%	7	33%	3	14%	9	42%	2	9%

GROUP C

MCE PROGRAM NAME: Money Management
STUDENT CATEGORY: Learning Disabled
NUMBER OF STUDENTS: 41
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 2.6 - 4.1
STUDENT I.Q. RANGE: Not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	12	57%	17	80%	16	76%	21	100%	4	19%
B	7	35%	14	70%	17	85%	20	100%	10	50%
C	0	0%	4	50%	8	100%	8	100%	8	100%

GROUP D

MCE PROGRAM NAME: Money Management
STUDENT CATEGORY: Learning Disabled
NUMBER OF STUDENTS: 41
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 2.6 - 4.1
STUDENT I.Q. RANGE: Not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	6	28%	17	80%	16	76%	20	95%	10	47%
B	4	19%	15	71%	17	80%	21	100%	13	61%

GROUP E

MCE PROGRAM NAME: Home Safe Home
STUDENT CATEGORY: Gifted Elementary
NUMBER OF STUDENTS: 58
STUDENT AGE MEAN: 8
READING GRADE EQUIVALENT LEVELS: 6.7 - 9.1
STUDENT I.Q. RANGE: 140 PLUS

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	12	80%	12	80%	15	100%	15	100%	3	20%
B	14	70%	14	70%	20	100%	20	100%	6	30%

GROUP F

MCE PROGRAM NAME: Poison Proof Your Home
STUDENT CATEGORY: Trainable Mentally Retarded
NUMBER OF STUDENTS: 8
STUDENT AGE RANGE: 12 - 15
READING GRADE EQUIVALENT LEVELS: 0.4 - 1.2
STUDENT I.Q. RANGE: 32 - 47

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	0	0%	4	20%	4	20%	12	60%	4	20%
B	0	0%	7	35%	6	30%	14	70%	6	30%

GROUP G

MCE PROGRAM NAME: Poison Proof Your Home
STUDENT CATEGORY: Educable Mentally Retarded
NUMBER OF STUDENTS: 18
STUDENT AGE RANGE: 12 - 15
READING GRADE EQUIVALENT LEVELS: 1.7 - 3.6
STUDENT I.Q. RANGE: 67-71

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	10%	11	55%	7	35%	17	85%	5	25%
B	8	40%	14	70%	12	60%	20	100%	4	20%

GROUP H

MCE PROGRAM NAME: Income Meets Expenses
STUDENT CATEGORY: Autistic
NUMBER OF STUDENTS: 8
STUDENT AGE MEAN: 13
READING GRADE EQUIVALENT LEVELS: 4.6 - 8.9
STUDENT I.Q. RANGE: Normal

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	9	42%	16	76%	14	66%	21	100%	5	23%
B	7	35%	12	60%	18	90%	20	100%	11	55%
C	3	37%	8	87%	5	62%	7	87%	2	25%

GROUP I

MCE PROGRAM NAME: You Can Bank On It
STUDENT CATEGORY: Physically Handicapped
NUMBER OF STUDENTS: 26
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 4.3 - 7.2
STUDENT I.Q. RANGE: 84 - 126

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	13%	15	100%	11	73%	15	100%	9	60%
B	4	26%	15	100%	11	73%	15	100%	7	46%

GROUP J

MCE PROGRAM NAME: Poison Proof Your Home
STUDENT CATEGORY: Socially Maladjusted and Adjudicated
NUMBER OF STUDENTS: unknown
STUDENT AGE MEAN: 18
READING GRADE EQUIVALENT LEVELS: 2.1 - 3.7
STUDENT I.Q. RANGE: not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	10%	10	50%	7	35%	14	70%	5	25%
B	0	0%	8	40%	9	45%	16	80%	9	45%

GROUP K

MCE PROGRAM NAME: You Can Bank On It
STUDENT CATEGORIES: 1. Educable Mentally Retarded
2. Emotionally Handicapped
3. Learning Disabled
NUMBER OF STUDENTS: Group 1 = 11
Group 2 = 16
Group 3 = 14
STUDENT AGE MEAN: 14.5
READING GRADE EQUIVALENT RANGE: 2.4 - 5.6

GROUP	TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
		LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
		N	%	N	%	N	%	N	%	N	%
1	A	2	7%	10	71%	8	57%	14	100%	6	35%
	B	0	0%	8	53%	8	53%	12	80%	8	53%
	C	0	0%	5	50%	7	70%	9	90%	7	70%
2	A	0	0%	14	100%	13	93%	14	100%	6	43%
	B	6	45%	15	100%	14	93%	15	100%	8	53%
3	A	9	64%	12	86%	12	86%	14	100%	3	21%
	B	8	53%	11	73%	13	87%	15	100%	5	33%
2&3	C	10	100%	10	100%						

NOTE: Group K reported the lowest score and the highest score (N) allowing the figuring of the pre and post-test range of low and high score for each vocabulary test alphabetically numbered for each group numerically numbered. The percent given is the total correct for the pre and post-test scores. The Minimum Growth is the number and percent difference between the lowest pre-test score and the lowest post-test score.

GROUP L

MCE PROGRAM NAME: Home Safe Home
STUDENT CATEGORY: Profoundly Deaf
NUMBER OF STUDENTS: 23
STUDENT AGE MEAN: 10
READING GRADE EQUIVALENT RANGE: 3.7 - 6.1

TEST	PRE-TEST X		POST-TEST X		AVERAGE GROWTH	
	X	%	X	%	N	%
A	12	60%	18	90%	6	30%
B	11	55%	19	95%	8	40%

GROUP M

MCE PROGRAM NAME: Money Management Assessment
STUDENT CATEGORY: 1. Educable Mentally Retarded
2. Emotionally Handicapped
3. Learning Disabled
NUMBER OF STUDENTS: Group 1 = 12
Group 2 = 18
Group 3 = 16
STUDENT AGE MEAN: 17
READING GRADE EQUIVALENT RANGE: 3.2 - 5.1

GROUP	TEST	PRE-TEST X		POST-TEST X		AVERAGE GROWTH	
		X	%	X	%	N	%
1	A	6	29%	11	52%	5	24%
	B	4	19%	9	43%	5	24%
2	A	9	43%	19	90%	10	48%
	B	8	38%	18	86%	10	48%
3	A	7	33%	17	81%	10	48%
	B	9	43%	20	95%	11	52%

NOTE: Groups L and M reported mean scores for each test (alphabetically numbered) for each group (numerically numbered). The mean growth is the mean score difference between pre and post-tests and the test score percentage gain.

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Project CAUSE

PIMA COMMUNITY COLLEGE
CENTER FOR THE INSTRUCTIONAL USE OF MICROCOMPUTERS

Through funding provided in part by a grant from the National Science Foundation (CAUSE 790442), the Pima Community College district has established a central facility to support educational microcomputer use. This project institutes a "library" of micro-computers, peripherals and software to support a broad range of instructional use. Training, release time and technical assistance are available for project participants.

The project is divided into three phases: EDUCATION, in which training will be provided for faculty and students; EXPERIMENTATION, in which instructional use of the devices will be made on a trial basis over a wide range of disciplines; and IMPLEMENTATION, in which some areas will completely integrate micro-computers into their instructional process.

Faculty indicate interest by applying through Pima's in-house grants procedure. Any project in Math/Science/Social Science that gets students using microcomputers is eligible. The emphasis however, is on using the computer in some way to help students learn something. (Educational uses such as computerized record keeping are nice, but secondary to the purpose of this project.)

Possible uses:

1. Simulations and Models - the computer is programmed to behave like some other system. The student interacts with the simulation to gain insight into the workings of the system. A separate printed manual introduces the simulation, asks questions and guides the student through the program. This uses the full intelligence of the computer and, if well done, holds the interest of the student. This technique is particularly useful if the process simulated is too expensive, too time consuming or too dangerous to do any other way. For example, a genetics breeding experiment which would take months or a nuclear process that would be very dangerous could be done this way.

2. Computer Assisted Instruction - The computer acts as a tutor, leading the student through some set of instruction. The branching ability of the computer is used to pick different responses according to the student's input. The PILOT language is simple to use and ideal for this use. The computer can also be interfaced to other A-V equipment.

3. Drill and Practice - The computer has infinite patience. It can randomly choose problems and examples and give immediate feedback.

4. Games - The computer can act as player or referee. To win, the student must know the math tables, chemical formulas, sentence construction or whatever subject matter the "regular" instruction includes. This is a useful way of instruction since the object for the student is not to learn the subject matter, but to win the game.

5. Connection to Other Equipment - The computer can control or "read" information from other devices. These could range from lab equipment to video tape recorders. Often when long series of calculations must be performed on experimental data, the point of the experiment is lost. A computer can log data, analyze it and present it in some easily understandable format.

During the past summer, approximately 25 Pima faculty began projects resulting in the instructional materials indicated below. Additionally, in order to facilitate software development, several "utility" routines allowing more flexible use of the APPLE's graphics capabilities were devised.

Because of their high resolution color graphics, rugged construction and available software, APPLE II microcomputers were chosen for the direct instructional uses. All of the programs listed below are written in Applesoft BASIC.

1. ASTRONOMY * "Sunrise/Sunset" - An animated simulation of the passage of the sun through the celestial sphere. Under development are programs on planetary motion and the constellations.

2. CHEMISTRY * "Precip" - A game using chemistry precipitation rules; "Nomenclature" - A tutorial on chemical nomenclature; "General Chemistry Drill and Practice Problems"; "Lab Safety Quiz".

3. COMPUTER SCIENCE * "Computer Components"; "Computer Operations" - an animated simulation of computer operation.

4. ECONOMICS * "Dynasty" - An improved version of the simulation by Weyman Fong.

5. GENETICS * "Genetics Terms"; "Making Gametes"; "Crosses Involving One Pair of Genes"; "Crosses Involving Two Pairs of Genes" - A set of tutorial programs on elementary genetics.

6. MATHEMATICS * "Graphing Linear Equations"; "Introduction to Matrices"; "Basic Math Programs" - Tutorials making full use of APPLE graphics.

7. PHYCHOLOGY * "Baby" - A simulation allowing students to use behavior modification techniques to change the behavior of a "baby".

8. PHYSICS * "Problem Tutor" - A set of programs guiding students through verbal physics problems; "Vector" - A set of graphics programs illustrating vector operations most useful in elementary physics; "Physics Lab" - A set of simulations making heavy use of graphics. Topics included are Newton's Laws, Momentum Conservation, Wave Addition, SHM vs. Rotational Motion, Optics, and the Kinetic Theory of Gasses.

9. UTILITIES (Programs to make programming easier) * "Skywriter" - A printing system allowing mixed text and graphics, varied character fonts, super and sub-scripting, and true scientific notation; "Paddle Shapes" - A program allowing creation of shape tables using APPLE paddles; "Tablet shapes" - A program allowing the creation of shape tables using the APPLE graphics tablet; "Shape Table Editor" - A

program allowing modification of shape tables; "Weird Stuff" - A collection of graphics routines allowing "interesting" manipulations of the text and graphics screens.

10. WRITING * "Outline" - A program guiding students through the procedure of writing logical outlines.

Other projects not mentioned above include development of a computer data base and information gathering system to support Pima's Anthropology Technicial Program and a system for psychology students to learn about the way they perceive imagery.

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The following paper *Computer Similations for Training of Telephone Installers* was written by Daniel Davidson and Allan Goodman from the Microcomputer Center, Pima Community College, Tucson, Arizona. It is included here to show the versatility of the microcomputer as an educational tool.

When some new technology becomes available the first uses of it mimic earlier devices or procedures. One can easily see that this has happened with microcomputers. At the crudest level, many "Instructional programs" use the computer as a $2000 page turner. The only response required from the student is the push of a key to call new information to the screen. The "drill and practice" programs recall the many "programmed learning" devices.

The computer is a completely new medium, presenting possibilities which may differ significantly from previous methodologies and therefore must be conceptualized quite differently. For example, text is "free." Since it does not cost more to print only a few lines of text per TV screen page, printing may be "unpacked" and made dynamic.

There is probably no better way to learn they by DOing. Often, however, the skill to be learned involves apparatus which is too expensive, dangerous or fragile to be used directly. Until recently, "trainers" capable of simulating the experience were used. A different trainer was specifically constructed for each "experience." Because of this specialization, the trainers themselves could be expensive.

Computers have been called "meta-machines", machines that can "become" any other. This is true on many levels. Presently, electrical engineers, instead of "hard wiring" a circuit such as an oscillator, will use an inexpensive, single-board microcomputer, programmed to produce the pulse. Then, to change the wave format, it is only necessary to change the program, NOT THE ELECTRONICS. Thus, one single device containing a microcomputer can be many devices, depending only on the set of instructions it is given.

At a higher level, given the correct programs, the computer can actually "become" anything. Changing it to something entirely different is as easy as changing the instructions. Furthermore, with the advent of microcomputers, which couple very sophisticated graphics and response systems with very low cost, the simulation may become "the" technique for computer based instruction in the future. Experiences with such simulations at Pima Community College reinforce this conjecture.

During the Spring 1981 Semester, the Pima College Community Campus offered a non-credit course on telephone installation for Mountain Bell Telephone prospective employees. The Micro-computer center was given a contract to develop a series of programs to augment the classroom instruction. The simulations discussed in this paper evolved from a collaboration of the authors with the Mountain Bell training staff.

Lesson Content

In keeping with Mountain Bell's established course format, a sequence of four modules of increasing complexity was developed. Each module was based upon the performance objectives designated for the course. For example, the first lesson described the installation of the cable to the simplest type of junction box, in which wires are attached directly to easily identifiable terminals. The second lesson requires knowledge of junction boxes containing masses of color coded wires. The third lesson added cross-connection of wires at a main terminal box and the use of a signal tracer. The final lesson emphasized trouble shooting using the standard test instruments.

The first three lessons are each divided into two levels: The first indicates whether or not the procedure is correct and, if incorrect, shows the acceptable response. Level two lessons respond simply with an "OK" or "NO" with no further prompting. Neither level allows the student to proceed until the correct procedure is carried out.

The fourth lesson is entirely "free" format. There is no prompting what-so-ever. The student may do anything. Only correct use the various simulated test instruments will determine the validity of an action. As well as incorporating the operations presented in the earlier modules, various "faults" such as broken, misconnected or shorted wires may exist. Simulated test instruments may be used to determine where the problems are, then corrective action must be taken. If the student fails to do so, the "telephone" will not function correctly when connected.

Lesson Format

As important as the information itself is the manner of presentation. Consideration of this can be discussed in two parts, the display system (what the student sees) and the control system (how the student interacts with the program).

It is generally accepted that there are "parallel ways of knowing": the left brain modes of intellect, abstraction and analysis and the right brain modes of intuition, analogy and relation. While the majority of the classroom materials focus on "left brain" activity, these modules make heavy use of the graphics capability of the APPLE II microcomputers to reinforce the concepts using the other way of "knowing." (1)

Four different "scenes" were constructed using information presented in the training and repair manuals: the main junction, the local junction, the outside connections and the inside connections (Appendix 1). The ability of the APPLE to store "shape tables" then recall them to the screen, coupled with graphics software developed at Pima College enabled the authors to accurately graphically portray not only the background but also the dynamic changes made as a consequence of the students' actions. "Skywriter", another utility program developed at Pima, was used to allow mixing of text and graphics, as well as special character fonts for emphasis. The APPLE supports two simultaneous "graphics screens" which may be viewed alternately. The first "screen" contains the scenes described above. On the second screen a simulated service order is available. Pushing the "ESC" key will allow the student to switch back and forth between these screens. Addresses, telephone numbers and wiring set-ups are chosen randomly so that it is impossible to memorize the sequence exactly. See examples on page 321.

In addition to the graphics being as accurate as possible, it was also possible to program the computer to reproduce the dial tone, ringing and signal generator tones needed for realism.

The "game paddles" available for the APPLE were chosen as the primary input device. A menu of possible actions is presented in the upper right of the screen. Rotating one paddle moves an arrow specifying the choice. When the arrow is positioned, pressing the game paddle button enters the choice. The learner's eyes need never leave the screen when interacting with the system. Thus, the student's concentration is not broken scanning the typewriter keyboard. (Most students at Pima College cannot touch type.) On the few times typing is required, (entering the addresses read from the "service order") only the correct sequence of characters and not their spacing is judged. Thus, poor typists are not penalized. Additionally, the programs are well "bullet-proofed." No information entered from the keyboard or game paddles will cause the program to terminate because of an input error. Furthermore, the first level of each module displays the correct response upon receiving an incorrect input.

The Setting

Installation students used the West Campus' Microcomputer Center. The computers are availble on a "walk-in" basis from 8:00 AM to 9:00PM with only casual assistance available. The microcomputers are networked to a Corvus Constellation master storage, which among other materials contains the programs discussed. The students are quickly lead, using single key responses through a series of menus, to the module they chose. Guidance must be provided completely by the system itself, even for those who are unfamiliar with microcomputers (and apprehensive of the experience).

Evaluation

According to Nelson's "Design of Virtuality";

> "An interactive system should become second nature, and become second nature quickly."
>
> "Moreover, interactive systems will be used
>
> intensively for hours, often by tired, high strung, frantic people."
>
> It is up to us designers to create fast elegant systems of operation without snag, dangers or complications." (2)

The Installation Modules conform well to this viewpoint. Pima students casually trying level 1 with NO previous background were able to successfully complete the lesson. Those who tried it more than once showed significant decreases in the number of inappropriate responses (recorded by the computer).

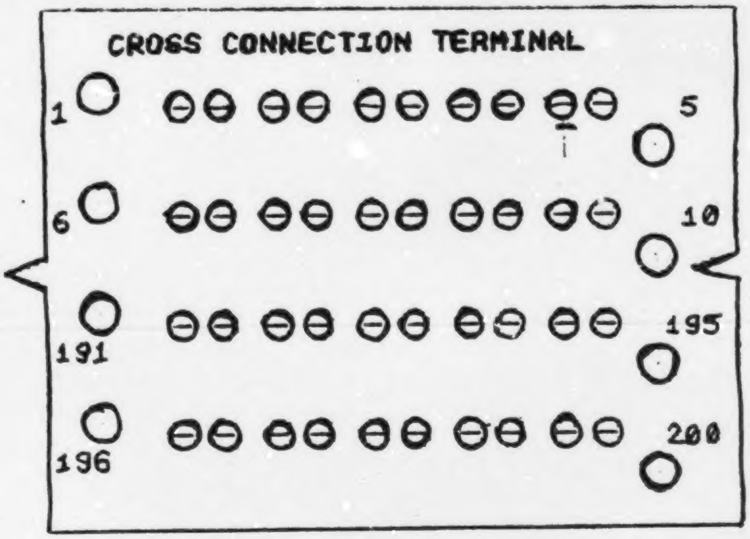
The Installation Class students VOLUNTARILY spent an average of three hours per lesson. Those questioned indicated that they enjoyed the experience because of its non-threatening game-like nature. Most important, the one group of students using the simulations performed significantly better on a standardized final exam. Since these statistics involve only two groups of ten students, further study is necessary to completely evaluate the modules' effectiveness. However, that it did help is clear. According to the course teachers, the LOWEST grade of those using the modules was NINETY PERCENT. The AVERAGE grade of the group using lecture only was seventy five percent! Finally, according to the instructors, the students using the microcomputer based simulations "walked through" the laboratory component of the course which followed the lectures since they had ALREADY DONE all of the procedures many times.

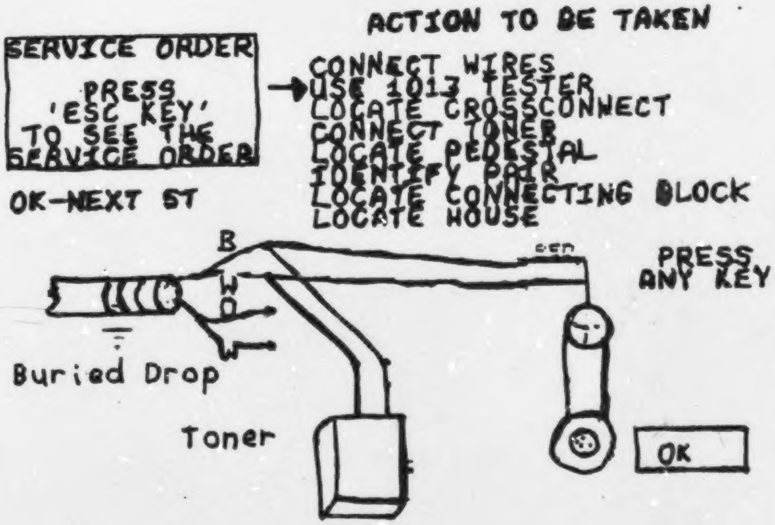
These materials perhaps represent one step towards a goal expressed very well by Ted Nelson;

> "But if you believe that somewhere beyond all the technicalities lies some kind of hope for a better future and a smarter mankind, rich in ideas, and knowledge and dreams-as well as gadgets-then the question is how to front-end the gadgets so they bring us knowlege, and ideas, and dreams, without the gadgets being in the way." (2)

1. T. Nelson, "The Design of Virtuality." Creative Computing, December, 1981, 6 (12).
2. J.E. Bogen, "The Other Side of the Brain." Bulletin of the Los Angeles Neurological Societies 1969, 34 73-105.

Some Examples of the Graphics Screens


CROSS CONNECTION TERMINAL
1
5
6
10
191
195
196
200


ACTION TO BE TAKEN
SERVICE ORDER
PRESS 'ESC KEY' TO SEE THE SERVICE ORDER
OK-NEXT ST
CONNECT WIRES
USE 1013 TESTER
LOCATE CROSSCONNECT
CONNECT TONER
LOCATE PEDESTAL
IDENTIFY PAIR
LOCATE CONNECTING BLOCK
LOCATE HOUSE
B
W
Buried Drop
Toner
PRESS ANY KEY
OK

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STRUCTURED OBSERVATION OF STUDENT PATH IN GOING THROUGH MICROCOMPUTER COURSEWARE

by

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Materials to Have Ready

- Computers in working order, preferably with print capability for collecting student responses.
- Diskette(s) for review.
- Workbook or other hard copy material, if available. Two copies, one for student(s) and one for an "observer."
- Stopwatch to time segments of the work.
- Extra paper for use if needed by student and notebook for "observer."
- Tape recorder to pick up student's thinking when "thinking aloud" and at probing points.
- Pens for student and observer. Do not use pencils since a complete record with no erasures and no crossouts is desired.

Tryout Space Arranged

- Quiet area free from interruptions or observers.
- Comfortable chair for student to work at computer with space and lighting for writing in workbook.
- Chair for observer next to student so that student's work can be observed on the computer and in the workbook.
- Writing surface for observer.

Guidelines for Activity During the Tryout:

Explain to Student the Purpose of the Tryout

- It is to test the material, not the student.
- We wish to find out how people use the material and what they find most useful or interesting.
- We wish to know where it is easy and where it is difficult so that we can find better ways of using the material to make it easier for others.

Ask Student to Make Responses Orally and in Writing So That You Can Follow His/Her Thinking

- "Think and talk out loud" as much as possible.
- Write down your answer completely where possible or necessary.
- Do not scratch out anything written so that it cannot be read.
- Work at a comfortable pace, but slow enough so that the observer can follow.
- As much as possible, write in the notebook or scratch paper in sequence so we can tell the order in which the work was done.

Tell the Student What You (TA) Will Be Doing

- Collecting print copy of student responses, if possible ("so I can go back to specific places and ask you what you did or thought at that point").
- Taking notes ("so I can go back to them to see how people use the materials").
- Observing ("to see how it works, and to mark down where it is easy, where difficult").
- Timing ("to see how long different segments take. But don't try to rush it. We want to see how long it takes at an easy pace").
- Taping ("so I can listen to it and follow your thinking").
- Probing or questioning ("so I can get a clearer picture of your thinking at places where it is difficult or more interesting").

Respond to Student When Asked "What Do I Do Now (Next)?" or "What Does This Mean?" At Any Time During the Work

- Say "do what you think it asks you to do."
- Say "read what it says (on the monitor/in the workbook) again and see if it makes sense."
- If necessary, write out additional instructions in the student's book to help make it clearer, or use notepaper, but keep a record of what you write since this is part of the course now. If you do say something orally, write it down, also.

Structured Interview Following Completion of Courseware Segment

Probing Points: Probe at Points Marked by You As Student Goes Through the Course

- "Error" points (where student response is not the "keyed response").
- Long latency points (where there was a long delay in student response or the student indicated something had gone awry or that something was being deliberated).
- Ambiguity points (where student comment indicated unclear or ambiguous material, whether the implication was a "material deficiency" or "personal deficiency").
- Appropriateness points (where student comments on how the course "should be" ideally, with or without specific criterion evidence to support the judgment).
- High-utility points (where student comments on particular interest, usefulness or value of the course or activity). End on this positive kind of probe.

Probing Procedure (preferably after each course segment)

- Refer to or point to or bring back on the screen or turn to workbook page or printout where probe is focused.
- Say something like "I noticed you (did, said, etc.) at this point."
- Ask open-ended questions about the point first (could you tell me more about what you were thinking at this point, what went through your head, what ideas you had or steps you went through).

- Ask for "anything else" to get the student to pursue further his/her thought processes.

- If the student is upset, use an appropriate "supportive" and "accepting" style that is honest.

- Probe for specific questions if any are left after the open-ended probe (e.g., "so you weren't sure if it meant 'this' or 'that' - can you tell me how you thought about the choice and how it came out this way?").

Summation Probes or Exit Interview After Completion of Diskette and Related Hard Copy Material

- What were the major obstacles or problems in going through the lessons?

- Would you recommend it to other students? Why? Why not? Any use for it that you can see?

- Do you have any other comments about the course and about my observing and making notes this way?

- Thank the student appropriately and sincerely comment on special features of the student's work you found most pleasing or commendable.

APPENDIX B

MICROCOMPUTER COURSEWARE EVALUATION OPEN-ENDED CHECKLIST

Instructions: This checklist requires observation of a student going through courseware instruction along with occasional interview or questioning of the student.

- Prior to beginning the observation-interview, go through the program or part of it yourself to get acquainted with the procedure.
- Use this checklist to note your own responses in using the course.
- Select a student typical of the population for whom the course was designed.
- Explain to the student that you are checking out the computer and the course so that you will know more about how it works.
- Tell the student you would like him/her to go through the program "thinking out loud" as he/she goes along so that you can get an idea of what is going on in his/her head.
- Demonstrate the "thinking out loud" by using a different program, and then have the student use that program to practice "thinking out loud" as he/she goes along.
- Have an open-ended checklist available with space between items to allow writing in observations. Use a cassette tape recorder if you can or even a videotape recorder, if possible. Use a clipboard for writing.

MICROCOMPUTER COURSEWARE EVALUATION OPEN-ENDED CHECKLIST

Instructions: Where a yes/no is asked for, circle your response. For open-ended questions, write in your response in the space provided. Be brief, descriptive, and to the point. Use typical examples of student performance where appropriate.

1. Can the student start up the program? Yes No

   If not, what skills or additional information must the student have in order to start?

2. Can the student proceed through the program with the information provided? Yes No

   a. If yes, by what means does the student do it?

      _____ displayed instructions

      _____ manual/workbook

      _____ other ______________________________

   b. If no, what skills or additional information must the student have?

3. Does the student have a Yes/No option for instructions at the beginning of the program? Yes No

4. What does the student actually do when beginning instructions are unclear?

5. Does the student have the option to go back to the instructions? Yes No

If no, how does the student proceed in order to get the necessary information to go on?

6. Can the student control the path of instruction? Yes No

   a. In which way?

      _____ skip sections

      _____ go back

      _____ increase or decrease speed

      _____ level of difficulty

      _____ other ______________________________

   b. Does the student know what the consequences are for each choice? Yes No

   c. What were the student's reasons for making the choices he/she did make?

7. Can the student input responses called for? Yes No

   What kind of responses are asked for?

   a. Numerical; what is the input order? Left to right
      Right to Left
      Inconsistent

   b. Alphanumeric/verbal? One letter One word Phrase

      Is word order and spelling important for correct evaluation of student input? Yes No

8. What does the student do when the instructions to do something are not clear? For example, how does the student attempt to get clarification or otherwise react to the lack of clarity?

9. Can the student correct an input before the computer evaluates the input?
Yes No

10. Is the student correction of input errors aided by provision of program messages? Yes No

11. How are correct responses acknowledged or confirmed?

a. _____ graphics

_____ exclamatory remarks

_____ sound

_____ continuation of program

b. Describe any special features of the confirmation.

c. What is the effect of the confirmation on the student?

12. How are incorrect responses acknowledged or corrected?

a. _____ graphics

_____ exclamatory remarks

_____ sound

_____ continuation of program

b. If error recognition and correction messages are go general that they miss important features of the student's errors, give an example of the student error and the acknowledgement and correction message.

c. Describe any other special features of acknowledgement or correction of errors.

d. What is the student's response to the acknowledgement of error?

To the error correction process?

To error messages that do not discriminate his/her specific error?

13. What student accomplishments (beyond the single response) are singled out for "reward" or special commendation through program feedback?

What criteria are used for "successful accomplishment?"

14. How does the student respond to special commendation or reward systems of the program?

15. Does the student have an option to repeat the program or end?
Yes No

a. If the student attempts to repeat, what happens?

How does the student react?

b. If the student attempts to end, what happens?

How does the student react?

16. When the student completes the session, what does he/she say in response to the following questions:

a. What was the lesson about? Tell me more.

b. Do you think this kind of work will help you? How?

c. What were the difficulties you encountered in going through the lessons?

d. Would you recommend this program to other students?

Who would they be?

Why?

Why not?

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VOICE

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CORRECTIONAL-INSTITUTIONS
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ORGANIZATIONS

PARENTS
PRIME-SPONSORS
PROFESSIONAL-ASSOCIATIONS
STAFF
STUDENTS
TEACHERS

A

ABORTIONS
ACCESS-TO-EDUCATION
ACADEMICALLY-DISADVANTAGED
ACCESSIBILITY (For Disabled)
ACCOUNTABILITY
ACCOUNTING
ADMINISTRATION
ADOLESCENTS
ADOPTION
ADULTS
ADULT-FARMER-EDUCATION
ADVERTISING
ADVISORY-COMMITTEES
AFFECTIVE-OBJECTIVES
AFFIRMATIVE-ACTION
AGRIBUSINESS
AGRICULTURAL-CROPS
AGRICULTURAL-ENGINEERING
AGRICULTURAL-EDUCATION
AGRICULTURAL-OCCUPATIONS
AGRICULTURAL-SAFETY
AGRICULTURAL-TECHNICIANS
AIR-CONDITIONING
ALASKA-NATIVES
ALCOHOLISM
AMERICAN-INDIANS
ANATOMY
ANIMAL-CARETAKERS
ANCILLARY-SERVICES
APPLIANCE-REPAIR
APPRENTICESHIPS
ARCHITECTURE
ARCHITECTURAL-BARRIERS
AREA-VOCATIONAL-SCHOOLS
ART
ARTICULATION
ASIANS
ASSEMBLY (Manufacturing)
ASSESSMENT
ASSOCIATE-DEGREES
ATTENDANCE
ATTITUDES
AUTISM
AUTO-BODY-REPAIR
AUTO-MECHANICS
AUTO-PARTS-CLERKS
AUTOMOTIVE
AVIATION-MECHANICS
AVIATION-OCCUPATIONS

B

BABY-SITTING
BANKING
BARBERING
BASIC-SKILLS
BEHAVIOR
BEHAVIORAL-OBJECTIVES
BIAS
BILINGUAL-EDUCATION
BIOGRAPHY
BIOMEDICAL-EQUIPMENT
BLACKS
BLINDNESS
BOOKKEEPING
BRICKLAYING
BUDGETING
BUILDING-TRADES
BUSINESS-EDUCATION

C

CABINET-MAKING
CAREER-AWARENESS
CAREER-CENTERS
CAREER-CHANGE
CAREER-DEVELOPMENT
CAREER-EDUCATION
CAREER-EXPLORATION
CAREER-LADDERS
CAREER-PLANNING
CARPENTRY
CASE-STUDIES
CASH-REGISTERS
CHE (Consumer & Homemaking
Education)
CHEMISTRY
CHILD-CARE
CHILD-CARE-OCCUPATIONS
CHILD-DEVELOPMENT
CHILD-REARING
CHILDREN
CHILDREN'S-LITERATURE
CIVIL-RIGHTS
CLASSIFICATION (Taxonomy)
CLERICAL-OCCUPATIONS
CLOTHING
CLOTHING-CONSTRUCTION
CLOTHING-DESIGN
CLOTHING-HISTORICAL
CLOTHING-OCCUPATIONS
COGNITIVE-OBJECTIVES
COMMERCIAL-ART-OCCUPATIONS
COMMUNICATION-SKILLS
COMMUNICATIONS
COMMUNITY
COMMUNITY-SERVICES
COMMUNITY-STUDIES
COMPENSATORY-EDUCATION
COMPETENCY-BASED-EDUCATION
COMPUTERS
CONFLICT-RESOLUTION
CONSERVATION-EDUCATION
CONSTRUCTION
CONSUMER-BORROWING
CONSUMER-EDUCATION
CONSUMER-FINANCE
CONSUMER-PROTECTION
CONSUMER-SERVICES
CONSUMER-SPENDING
COOPERATIVE-EDUCATION
COORDINATION
CORRECTIONAL-EDUCATION
CORRECTIONAL-REHABILITATION
COSMETOLOGY
COST-EFFECTIVENESS
COURSE-EVALUATION
COURSES
COURT-REPORTING
CREATIVITY
CREDENTIALS
CRITERIAN-REFERENCED-TESTS
CROP-PROCESSING-OCCUPATIONS
CULTURAL-AWARENESS
CURRICULUM-DEVELOPMENT
CURRICULUM-EVALUATION
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D

DAILY-LIVING-SKILLS
DATA-PROCESSING-OCCUPATIONS
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DEAFNESS
DEATH
DECISION-MAKING
DEMONSTRATION-PROGRAMS
DENTAL-ASSISTANTS
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DIETETICS
DISADVANTAGED
DISPLACED-HOMEMAKERS
DISTRIBUTIVE-EDUCATION
DIVORCE
DRAFTING
DRIVER-EDUCATION
DROPOUTS
DRUG-ABUSE

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